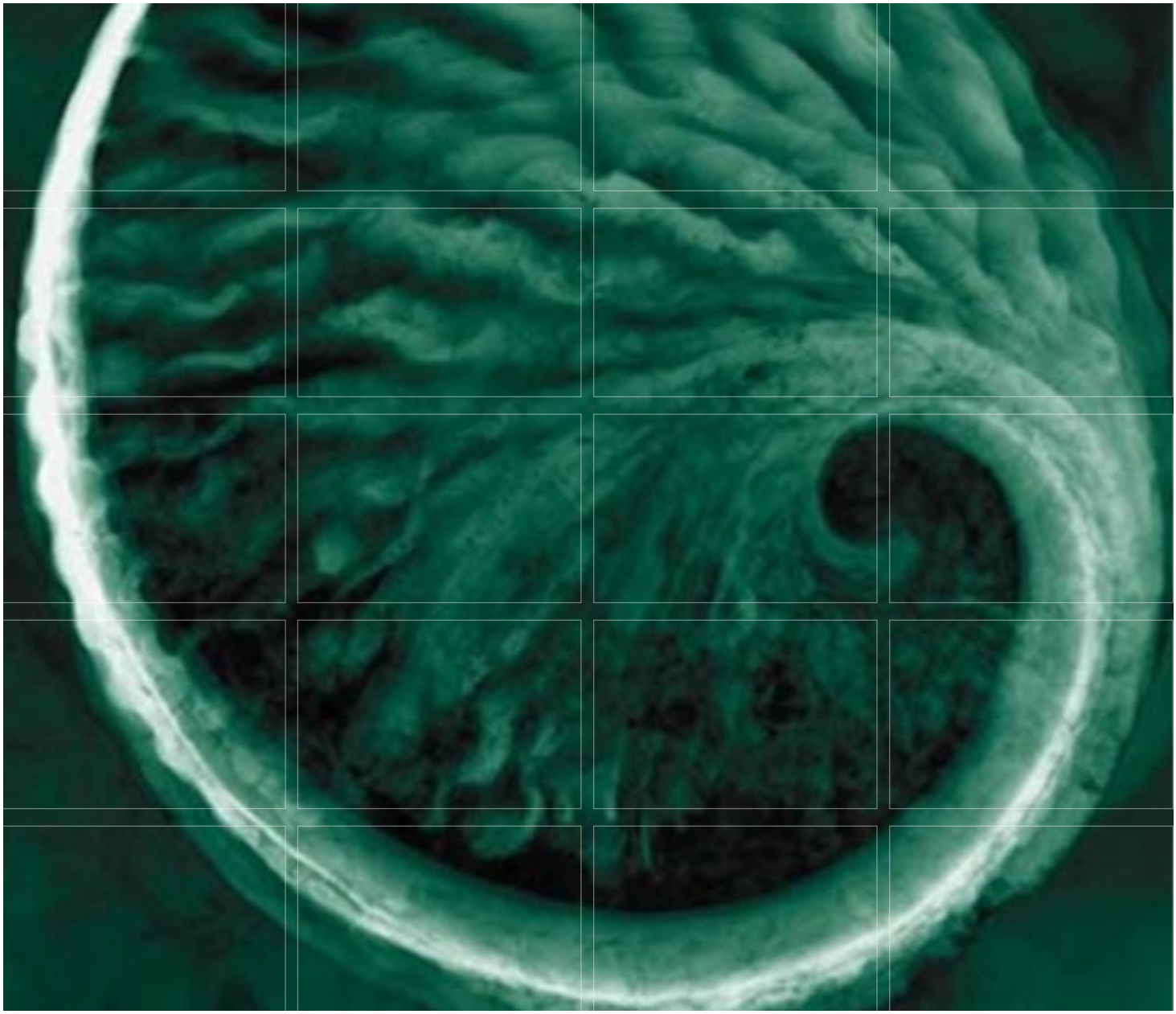


Prepared for:

PRETIVM

BRUCEJACK GOLD MINE PROJECT

Nisga'a Economic, Social, and Cultural Impact Assessment Report

November 2014

The world's leading sustainability consultancy

ERM

Pretium Resources Inc.

BRUCEJACK GOLD MINE PROJECT

Nisga'a Economic, Social, and Cultural Impact Assessment Report

November 2014

Project #0194151-0131

Citation:
ERM Rescan. 2014. *Brucejack Gold Mine Project: Nisga'a Economic, Social, and Cultural Impact Assessment Report*. Prepared for Pretium Resources Inc. by ERM Consultants Canada Ltd.: Vancouver, British Columbia.

ERM Rescan
Rescan Building, 15th Floor
1111 West Hastings Street
Vancouver, BC
Canada V6E 2J3
T: (604) 689-9460
F: (604) 687-4277

BRUCEJACK GOLD MINE PROJECT

Nisga'a Economic, Social, and Cultural Impact Assessment Report

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

GLOSSARY AND ABBREVIATIONS

Terminology and acronyms used in this document are defined where upon first use.

AANDC	Aboriginal Affairs and Northern Development Canada (formerly INAC)
BC EAO	British Columbia Environmental Assessment Office
CEA Agency	Canadian Environmental Assessment Agency
EA	Environmental Assessment
EAO	Environmental Assessment Office
ESCIA	Economic, Social, and Cultural Impacts Assessment
GNWT	Government of the Northwest Territories
HRDC	Human Resources and Development Canada
IBA	Impact and Benefit Agreement
IFC	International Finance Corporation
IISD	International Institute for Sustainable Development
LHA	Local Health Area
MVEIRB	Mackenzie Valley Environmental Impact Review Board
NAHO	National Aboriginal Health Organization
NFA	Nisg̲a'a Final Agreement
NCFS	Nisg̲a'a Child and Family Services
NDIT	Northern Development Initiative Trust
NFA	Nisg̲a'a Final Agreement
Nisg̲a'a villages	Gingolx (Kincolith), Laxg̲alts'ap (Greenville), Gitwinksihlkw (Canyon City), and Gitlaxt'aamiks (New Aiyansh)
NLG	Nisg̲a'a Lisims Government
NTL	Northwest Transmission Line
NNKN	Nisg̲a'a Nation Knowledge Network
NVHA	Nisg̲a'a Valley Health Authority
Pretivm	Pretium Resources Inc.
PYLL	Potential Years of Life Lost
SERC	Social, Economic, Resource Use, and Culture
VC	Valued Component
WWNI	Wilp Wixo'xskwhl Nisg̲a'a Institute

1. INTRODUCTION

The Brucejack Gold Mine Project (the Project) proposed by Pretium Resources Inc. (Pretivm) is situated adjacent to Brucejack Lake approximately 65 km north of the Town of Stewart. The Project is subject to the *British Columbia Environmental Assessment Act* (2002) and the *Canadian Environmental Assessment Act* (2012). This report has been prepared on behalf of Pretivm pursuant to Chapter 10, paragraph 8(f) of the Nisga'a Final Agreement (NFA; NLG, Province of BC, and Government of Canada 1998). Paragraph 8(f) requires that, in addition to applicable environmental assessment legislation, the British Columbia Environmental Assessment Office (BC EAO) and Canadian Environmental Assessment Agency (CEA Agency) must also:

> 8(f) assess the effects of the project on the existing and future economic, social and cultural well-being of Nisga'a citizens who may be affected by the project.

This report provides analysis that is specific to Nisga'a Nation and is supplemental to the Project's Environmental Assessment Certification Application and Environmental Impact Statement (Application/EIS) pursuant to provincial and federal requirements. The objective is to evaluate the potential effects of the proposed Project on the current and future well-being of Nisga'a people, including those living in the Nisga'a villages and those living outside of the Nass Area in Terrace, Prince Rupert, and other parts of British Columbia (NLG, Province of BC, and Government of Canada 1998).

1.1 PROJECT DESCRIPTION AND LOCATION IN RELATION TO NISGA'A LANDS, NASS WILDLIFE AREA, AND NASS AREA

The Project is subject to requirements of the NFA on the basis that the access road and separate transmission line corridor, two key components of Project infrastructure, traverse the Nass Area as defined in the NFA.

The primary mine access route traverses the Nass Area from Highway 37 up Wildfire Creek, across Scott Pass and down Scott Creek into the Bowser River Valley above Bowser Lake (Figure 1.1-1). The road continues up the Bowser River to the toe of Knipple Glacier. A transfer station will be constructed near the base of the glacier to support the transfer of personnel and materials from vehicles to tracked vehicles to traverse the glacier. The transfer station will have a footprint of about eight hectares. The existing exploration access road will be upgraded to handle mine construction and operation traffic and is referred to throughout this report as the Brucejack Access Road.

The proposed transmission line will run from the Long Lake Hydroelectric Project just north of Stewart, past the old Granduc Mine site and across high alpine and glaciated terrain north to Brucejack Lake and the proposed mine site (Figure 1.1-1).

The access route up to the glacier is part of the Bowser drainage system which flows into the Bell-Irving and thence the Nass River, all of which fall within the Nass Area. Brucejack Lake drains to the west, away from the Nass Area, into Sulphurets Creek, a tributary of the Unuk River. The

transmission line will traverse the northwest portion of the Nass Area although it will not pass into the Nass Wildlife Area (NWA). The mine site itself falls just outside the Nass Area and lies approximately 160 km northwest of the nearest Nisga'a village (Figure 1.1-1).

The general area of the Brucejack Property has been the target of mineral exploration since the 1960s. In the 1980s Newhawk Gold Mines Ltd. conducted advanced exploration activities at the current site of the proposed Project including construction of an access road along the Bowser River and Knipple Glacier, 5 km of underground development, and deposition of 60,000 m^3 of waste rock within Brucejack Lake.

The Project as proposed by Pretivm is a 2,700 tonne per day (tpd) underground gold and silver mine. The Brucejack Property is located within the Regional District of Kitimat-Stikine (RDKS). In addition to Nisga'a treaty lands, several First Nations have traditional territory within the general region of the Project including the Skii km Lax Ha, Tahltan, Gitxsan, and Gitanyow First Nations.

Mine supplies will be trucked along the Brucejack Access Road from Highway 37 to the mine and concentrate will be transported by truck from the mine to Highway 37. Project related traffic during operations is estimated at between approximately 2,700 and 3,100 trips per year. About 45 to 48% of these trips will be outbound taking mine concentrates to market. Mine concentrates will be transported via Highway 37 and 37A to the port at Stewart for shipment oversea or to a rail facility along Highway 16 for shipment to eastern Canada. Mine supplies will generally be brought in from regional centres, mainly Smithers and Terrace via Highway 16 and 37.

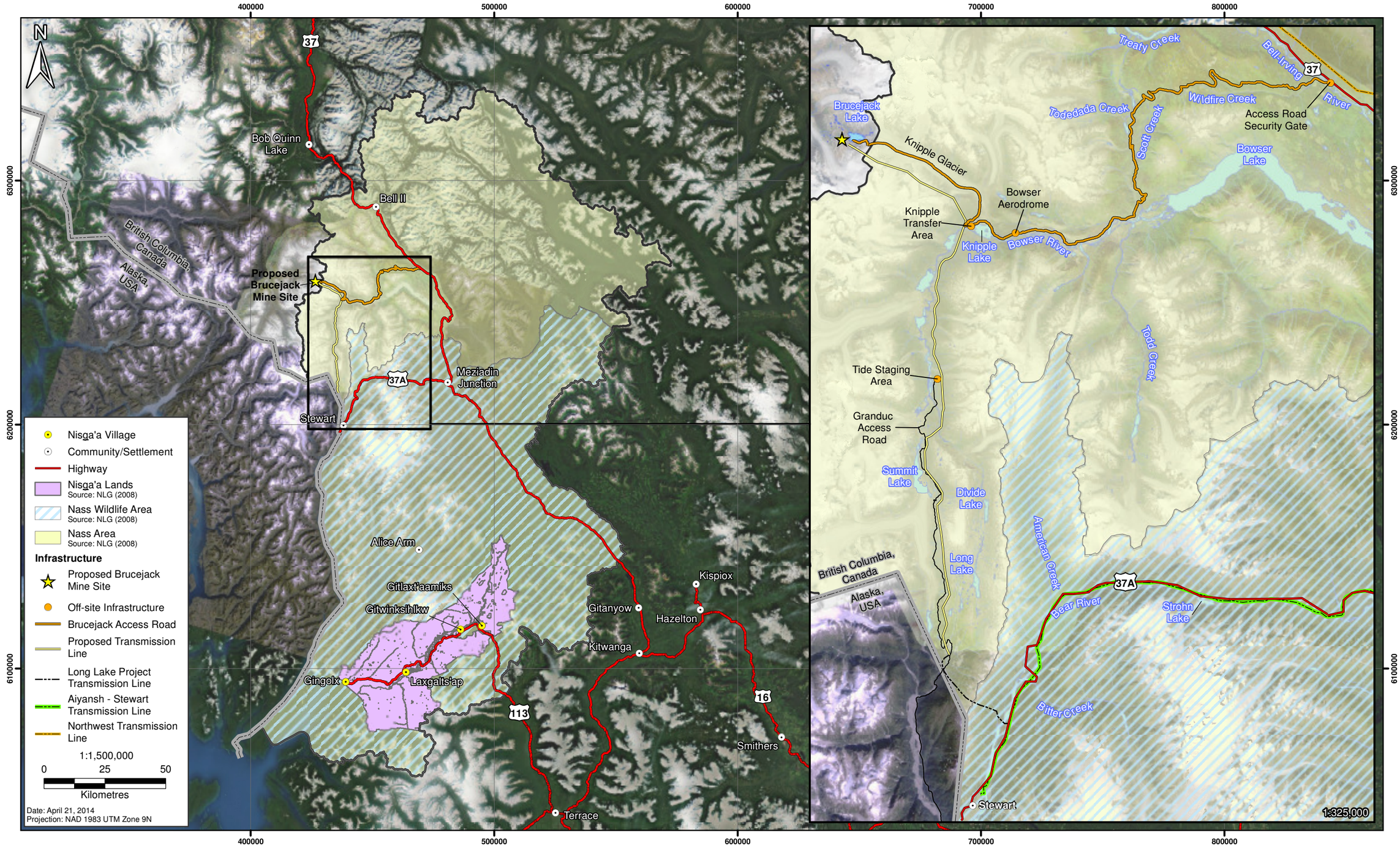
The volume of supply traffic along Highway 37 and the Brucejack Access Road during the construction period will be 35 to 38% more than supply traffic during operations, although overall construction traffic will be less than total operations traffic volume. The maximum number of supply trucks over the construction period will be approximately four per day. Project-related traffic will also occur along the Granduc Access Road between Stewart and the former Granduc Mine staging area during the construction phase of the Brucejack Transmission Line. Project-related traffic during closure and post-closure phases is expected to be considerably less than those estimated during operations.

The Project will require a two year construction period and will operate for approximately 22 years once commissioned.

1.2 SUMMARY OF NISGA'A LISIMS GOVERNMENT GUIDELINES FOR ECONOMIC, SOCIAL, AND CULTURAL IMPACT ASSESSMENT

On November 1, 2010 the NLG provided to the CEA Agency and BC EAO revised Economic, Social and Cultural Impact Assessment (ESCIA) Guidelines for environmental assessments subject to the NFA. The ESCIA Guidelines outline the sorts of information NLG identifies as necessary and provides a framework for a meaningful assessment of potential economic, social, and cultural effects of a project on the wellbeing of Nisga'a people and communities that may arise during the construction, operation, and closure of the Project. The scope of the assessment, as summarised from the ESCIA Guidelines, is to include the following.

Figure 1.1-1
Location of Proposed Brucejack Gold Mine Project in Relation to Nisga'a Lands and the Nass Area



Economic Effects

Assessment to include analysis of potential effects on:

a) Nisga'a employment and income;
b) Nisga'a business activity and earnings and investment activity;
c) Nisga'a natural resource activity and related earnings or value;
d) Nisga'a Government revenues and expenditures; and
e) future Nisga'a Nation economic opportunities and economic development.

Social Effects

Assessment to include analysis of potential effects on:

a) migration and population including:
   - immigration to and emigration from Nisga'a villages;
   - Nisga'a and non-Nisga'a population size and demographics in Nisga'a villages and elsewhere;
b) infrastructure and services:
   - housing and community infrastructure;
   - medical, education, emergency and social services;
   - transportation services and infrastructure;
c) occupational and non-occupational health risks;
d) occupational and non-occupational accident risks; and
e) crime and family and community well-being.

Cultural Effects

Assessment based on analysis of potential effects on Nisga'a cultural activities and practices including:

a) direct effects of potential environmental impacts of the proposed Project on Nisga'a cultural activities and practices;
b) effects of changing work patterns and incomes on Nisga'a cultural activities and practices; and
c) effects on Nisga'a language.

Cumulative and Cumulative-Incremental Effects

In addition to the specified assessment of potential economic, social and cultural effects related to the Project, the ESCIA Guidelines also require consideration of the *cumulative* and *cumulative incremental* effects of the Project in the context of other ongoing or proposed projects.

The ESCIA Guidelines employ a definition and interpretation of cumulative incremental effects that differs somewhat from that generally used by BC EAO and the CEA Agency. Whereas standard environmental assessment procedure is to consider the incremental effects of a project as a degree of change from baseline conditions and cumulative effects as the combined effects of a range of completed, current and proposed activity, the ESCIA Guidelines require that the incremental effects of the project in question be considered not only against baseline conditions but also in the context of a range of potential future scenarios of cumulative effects. That is, the guidelines ask to evaluate the relative effect of the Project in comparison to the combined effects of some or all anticipated development, including other development that may occur as a result of the Project itself. The goal is to assess not only how the Project effects current conditions, but also a comparison of the Project's relative contribution to future change at various levels of development (see Section 2.2.4).

2. STUDY APPROACH AND METHOD

This report integrates traditional environmental assessment methodology and specific research methods developed to address the purpose and objectives of the ESCIA Guidelines. A mix of quantitative and qualitative data and analysis are used.

The framework and overall scope of the study is derived from the ESCIA Guidelines described in Section 1.2. The study is also informed by two previous ESCIA reports completed for two separate projects, the Kitsault Mine Project and the KSM Project (Rescan 2012b, 2012a) on behalf of other proponents (see Section 2.1). The primary research conducted for these earlier studies required the use of the time and resources of numerous Nisga'a citizens, village governments, and the NLG. To limit further such demands and to avoid replication of previous efforts as much as practical while still meeting the requirements defined in the NFA Chapter 10, paragraph 8(f), this report draws substantially from the original data produced by surveys and interviews carried out in late 2011 and early 2012 for the two aforementioned ESCIA reports. The approach adopted here is to make use of the fieldwork and primary data generated for those studies in combination with new or updated data, information and analysis specific to the Brucejack Gold Mine Project.

2.1 SYNOPSIS OF PREVIOUS ESCIA RESEARCH AND REPORTS

Between early-2011 and mid-2012 two full ESCIA reports were completed pursuant to the NFA as part of two separate applications for an environmental assessment certificate on behalf of: (1) Avanti Resources Inc. for their proposed Kitsault Mine Project and, (2) Seabridge Gold Inc. for their proposed KSM Project.

Given the overlap in the timing of the Avanti and Seabridge applications it was agreed between NLG, BC EAO, CEA Agency, and the two proponents that the two projects should coordinate their research efforts to reduce unnecessary duplication of effort and minimize the demands placed on the time and resources of Nisga'a citizens and government. Parallel work plans were developed in 2011 defining a range of primary and secondary research activities designed to fulfil the requirements of the ESCIA Guidelines.

The research programme featured four main components: (i) a household-level survey of Nisga'a citizens, (ii) a survey of Nisga'a businesses, (iii) focus groups with Nisga'a citizens, and (iv) a comparative review of three case studies of currently operating mines in Canada and their effects on and interactions with Aboriginal communities particularly with respect to employment and business benefits. The results of these efforts provided the empirical basis for the ESCIA reports for each of the Kitsault and KSM projects.

The research that formed the basis for these assessments included:

- the Social, Economic, Resource Use, and Culture (SERC) Survey carried out in the summer and fall of 2011;
- the Nisga'a Business Survey carried out in the fall of 2011;

- communication and semi-structured interviews with key persons from Nisga'a communities, including NLG and other Nisga'a representatives;
- focus groups carried out with Nisga'a citizens in the Nisga'a villages, Terrace, Prince Rupert, and Vancouver, conducted in March and April, 2012;
- secondary research and review of relevant documents, including official statistics, peer-reviewed and grey literature case studies, and reports, in particular, in reference to natural resource projects in similar socio-cultural contexts; and
- baseline research and reports and effects assessments completed or in development by ERM Rescan personnel across multiple disciplines including social and economic sciences, land-use, aquatics, wildlife, and transportation, among others (see the Brucejack Gold Mine Project Application/EIS).

The SERC Survey research was undertaken with Nisga'a citizens in the four Nisga'a villages, Terrace, Prince Rupert, and Vancouver between August and November 2011. The survey was developed with input from the NLG, BC EAO, CEA Agency, Avanti Kitsault Mine Inc., and Seabridge Gold Inc. Questions were designed to obtain demographic data, employment history and skills, opinions on mine employment, intentions to move to or away from Nisga'a communities, language use, and participation in cultural activities such as harvest and use of Nisga'a resources. A total of 405 responses to the survey were obtained (Appendix 2, Rescan 2012a).

The Nisga'a Business Survey involved interviews with 22 local Nisga'a businesses located in the Nisga'a villages. The intent of the survey was to understand how Nisga'a businesses might respond to anticipated business opportunities to provide goods and/or services to the mining company or its contractors during construction and operation activities.

In March and April 2012, a series of focus groups were held in the four Nisga'a villages and in Terrace and Prince Rupert with separate sessions including groups of youth, Elders, women, and men. There were a total of 24 groups, with most drawing between eight and ten participants per group. In Vancouver, one focus group with 10 participants was carried out with Nisga'a citizens living in the Lower Mainland. In total, 206 Nisga'a citizens participated and contributed their opinions and insight on a wide range of cultural, social, and economic issues important to the Nisga'a Nation (Rescan 2012b, 2012a).

2.2 METHOD FOR ECONOMIC, SOCIAL, AND CULTURAL IMPACT ASSESSMENT

The assessment is based on a combination of data and analysis from the SERC and Nisga'a Business Surveys, interview and focus group results, Project-specific design inputs, and application of standard effects assessment methods. The assessment does not attempt to assign a formal determination of significance, but rather provides a characterization and description of the impacts in order to assess each potential effect identified through the scoping process described in Section 3. Determination of significance is provided in the Brucejack Gold Mine Project Application/EIS, where applicable.

Key economic, social, and cultural valued components (VCs) are defined based on the ESCIA Guidelines. A scoping exercise is used, drawing on previous ESCIA results and current research and data to identify and define the degree of interaction between VCs and various anticipated Project effects. VCs for which some level of interaction with Project components or activities is predicted are assessed with respect to the incremental effects of the Project and the broader cumulative effects of regional resource development in general. VCs where interaction with the Project is either not expected or, at most minimal as to have a negligible residual effect, are not carried forward in the assessment.

2.2.1 Economic Impact Assessment

The ESCIA Guidelines identify five key issues relevant to the assessment of economic effects of the proposed Project on Nisga'a citizens and communities, these include:

- employment and income:
- business activity and earnings;
- natural resource activity and related earnings or values;
- government revenues and expenditures; and
- economic opportunities and economic development.

To evaluate the economic effects, three scenarios with various levels of regional development were considered (i.e., a low, medium, and high regional development scenarios; see Section 2.2.4). Each scenario included the effects of development both with and without the Brucejack Gold Mine Project. For each scenario, estimates of total Nisga'a employment and procurement of Nisga'a businesses by the projects were developed. The estimates were based primarily on the expectations and predictions for each project considered in each scenario using information available on the project designs, prefeasibility studies, and environmental assessments, as well as other publically available information. Estimates of income effects were based on predicted employment impacts using published information on industry earnings. The assessment of economic effects was further supplemented with data and information obtained from the SERC and Nisga'a Business Surveys, information provided by the NLG, and other publicly available sources.

2.2.2 Social Impact Assessment

The ESCIA Guidelines identify four key issues or processes relevant to the assessment of current and future social effects of the proposed project on Nisga'a citizens:

- migration and population;
- infrastructure and services;
- personal health and well-being; and
- community well-being.

Baseline conditions are described based on review of previous assessments, government statistics, secondary literature (including peer reviewed articles and "grey" literature, e.g. government reports, consultants' studies, media reports and unpublished manuscripts), and information from focus groups and key person interviews.

The main drivers of Project-related social impacts defined for this assessment are population change, changes in household income, and mining-related work schedules. Estimates of population change are the main quantitative measures against which potential social effects are evaluated. Population projections for Nisga'a citizens living on Nisga'a Lands are based on two distinct sources:

a) BC Stats P.E.O.P.L.E (Population Extrapolation for Organizational Planning with Less Error) model for Local Health Area (LHA) 92 Nisga'a; and

b) A population model developed for previous ESCIA research based on results from the SERC Survey.

The BC Stats model is based primarily on census data but with a series of inputs and updates from a variety of other provincial sources. The SERC-derived population model provides an estimate of Project-induced migration based on questions in the SERC Survey about (i) respondents current intentions to move to (or back to) Nisga'a Lands and (ii) whether or not mine development in the region would affect their decision to move or not to move.

Population projections are discussed and applied as appropriate in the assessment of effects of the Project on community infrastructure and services, risks to personal health and well-being, and social risks to community well-being.

The potential impacts of Project-related incomes and work schedules are assessed in a discursive manner drawing on a combination of previous research studies and experience, the perspectives and opinions of Nisga'a citizens gleaned from the SERC Survey, focus groups and interviews, and professional judgement.

2.2.3 Cultural Impact Assessment

The ESCIA Guidelines provide a focused definition of cultural effects. The SERC Survey and focus groups provided the main empirical basis for assessment of the potential Project effects on Nisga'a cultural activities and practice. The key cultural issues of concern identified in the ESCIA Guidelines include: (i) Nisga'a cultural practices relating to the harvest and use of land and aquatic resources (i.e., fish, wildlife, and plants), (ii) participation in ceremonies, feasts, and other cultural activities, and (iii) Nisga'a language.

Additional review of SERC Survey data and additional key person interviews were used to gain further insight and understanding of the potential links between Nisga'a culture and the Project. Based on findings of earlier assessments and on consideration of potential Project interactions some cultural attributes and issues of concern identified in the ESCIA Guidelines are not carried forward in the Project effects assessment.

2.2.4 Incremental, Cumulative, and Cumulative-Incremental Effects

The assessment of incremental, cumulative, and cumulative-incremental effects of the Project are dealt with differently owing to the type, quality, and availability of data and the limitations of forward looking analyses. The assessment presented in the report makes two key assumptions:

a) the changes and impacts the Nisga'a people will experience in relation to mine development and other projects will be primarily a function of the migration of people and the flow of money into or out of Nisga'a communities; and

b) such changes (i.e., the movement of people and money) will be driven by the economic effects that arise from project-related expenditures including various types of employment and business activity.

The analysis of demographic and economic data provides the main quantitative basis for the assessment of the potential economic, social, and cultural effects of the Project. The approach to the assessment of incremental effects and cumulative effects was outlined earlier in Sections 2.2.1 to 2.2.3.

Cumulative-incremental effects as defined in the ESCIA Guidelines are distinct from the way incremental and cumulative effects treated in typical EA practice. The objective of looking at cumulative-incremental effects is to consider the incremental effects of a project in the context of changing cumulative conditions, rather than simply by comparison to a static set of baseline conditions. The approach requires that the impacts of the Project be considered within the context of ongoing regional development, which is expected to be driven by a range of planned and existing resource-based projects (NLG 2010). One of the main goals of such an approach is to be able to consider how the incremental effects of a particular project, in this case the Brucejack Gold Mine Project, may change under different scales or levels of development. Cumulative-incremental effects assessment, therefore, entails the development of a number of scenarios to capture a range of possible futures against which the relative impacts of the proposed Project can be evaluated.[1] Specifically, the objective of the scenarios exercise is to provide a basis to assess different levels of regional economic development (i.e., cumulative change) concurrently with effects of the Project (i.e., incremental change).

Cumulative-incremental impacts are assessed within a framework of three scenarios that represent different levels or scales of regional development over the duration of the Project[2]. With guidance from NLG, and past ESCIA reports informed by the BC EAO and CEA Agency, three scenarios were defined to characterize conditions of "low," "medium," and "high" levels of regional economic

[1] Scenarios are systematic narratives that attempt to describe possible future outcomes and consequences of specific actions and decisions. Scenarios are built from a combination of known facts and data and the estimation of plausible future change and trends. Ideally, scenarios should represent a "shared vision of the future" and be developed with input from multiple perspectives including the Nisga'a, First Nations, and stakeholders. The projections of economic impacts of additional projects is based upon limited data as many of the projects included in each scenario are at the pre-feasibility design stage and publicly available information is limited.

[2] The projects included in each of the scenarios were agreed to in advance by the CEA Agency, BC EAO, and NLG.

development. The conditions for each scenario were framed around assumptions about the number and types of projects expected to proceed through to construction and operation. For each level of development the analysis was completed both with and without the inclusion of the proposed Project (i.e., to indicate incremental effects) for a total of six scenarios. Data from other projects being proposed or planned for the region were used to provide an empirical basis from which to project different levels of development (Table 2.2-1). These provided reference points to guide projections and analysis of potential change in variables such as employment, implications for business, and population.

Table 2.2-1. Development Projects Included in the Scenario Analysis

Project	Status	Estimated Cost ($Million)	Observations
Northwest Transmission Line (NTL; BC Hydro)	Approved	$736	Under construction; planned completion in 2014. Estimated: 705 person-years of employment during construction; 20 person-years of employment during operation.
Forrest Kerr (AltaGas Energy LP)	Approved	$725	Under construction; planned completion in 2014. Estimated: 130 person-years of employment during construction; 148 person-years of employment during operation.
McLymont Creek (Altagas Renewable Energy Inc.)	Approved (amendments)	$217	Under construction; planned completion in 2015. Estimated: 375 person-years of employment during construction; 144 person-years of employment during operation.
Red Chris Porphyry (Imperial Metals Corp.)	Approved	$500	Under construction; planned completion in 2014. Estimated: 800 person-years of employment during construction; 8,400 person-years of employment during operation.
KSM (Seabridge Gold Inc.)	Under Review	$5,310	Construction planned to begin in 2014. Estimated: 9,314 person-years of employment during construction; 34,480 person-years of employment during operation.
Kitsault (Avanti Mining Inc.)	Approved	$938	Construction planned to begin in 2014. Estimated: 1,200 person-years of employment during construction; 4,800 person-years of employment during operation.
Schaft Creek (Copper Fox Metals)	Proposed (pre-Application)	$3,300	Feasibility study complete. Construction planned to begin in 2016. Estimated: 2,000 person-years of employment during construction; 18,000 person-years of employment during operation.
Galore Creek (NovaGold Resources Inc./Teck Resources Ltd.)	On Hold	$5,000	Mine plan under review. Construction planned to begin in 2015. Estimated: 2,700 person-years of employment during construction; 9,954 person-years of employment during operation.

Source: Compiled from publicly available information from the Project Information Centre (e-PIC) on the BC EAO (2013) website, public securities documents filed in the System for Electronic Document Analysis and Retrieval (SEDAR), and company websites as of December 2013.

The six scenarios used to evaluate cumulative and incremental effects are:

a) Scenario 1a (low regional project development **without** the Project). This scenario includes projects that are highly likely to proceed *excluding* the Project. Included projects are: the Northwest Transmission Line (NTL), Forrest Kerr Hydro, McLymont Creek Hydro, and Red Chris Mine Project.

b) Scenario 1b (low regional project development **with** the Project). This includes projects that are highly likely to proceed *including* the Project. Included projects are: the NTL, Forrest Kerr Hydro, McLymont Creek Hydro, Red Chris Mine Project, and the Brucejack Gold Mine Project.

c) Scenario 2a (medium regional project development **without** the Project). This includes projects that are reasonably likely to proceed *excluding* the Project. Included projects are: the NTL, Forrest Kerr Hydro, McLymont Creek Hydro, Red Chris Mine Project, Kitsault Mine Project, and KSM Project.

d) Scenario 2b (medium regional project development **with** the Project). This includes projects that are reasonably likely to proceed *including* the Project. Included projects are: the NTL, Forrest Kerr Hydro, McLymont Creek Hydro, Red Chris Mine Project, Kitsault Mine Project, KSM Project, and the Brucejack Gold Mine Project.

e) Scenario 3a (high regional project development **without** the Project). This includes projects that are somewhat likely to proceed *excluding* the Project. Included projects are: the NTL, Forrest Kerr Hydro, McLymont Creek Hydro, Red Chris, Kitsault, and KSM, as well as Galore Creek, and Schaft Creek mine projects.

f) Scenario 3b (high regional project development **with** the Project). This includes projects that are somewhat likely to proceed *including* the Project. Included projects are: the NTL, Forrest Kerr Hydro, McLymont Creek Hydro, Red Chris, Kitsault, and KSM, and Galore Creek, and Schaft Creek mine projects, as well as the Brucejack Gold Mine Project.

A comparative discussion of cumulative-incremental effects at the three levels of potential development is presented at the end of each of Section 5 (Economic Impact Assessment), Section 6 (Social Impact Assessment), and Section 7 (Cultural Impact Assessment).

The ESCIA Guidelines imply an additional interpretation of cumulative-incremental effects focused on the impacts of other activities, projects or developments that might be enabled or initiated as a result of the Project. These are defined as "…the total changes or impacts relative to what could otherwise be expected if the Project did not proceed. These cumulative-incremental effects will reflect not only the impacts of the proposed Project, but also the impacts of other initiatives or projects that could reasonably be expected to accompany or follow it" (NLG 2010).

It is very speculative to anticipate what other projects might be undertaken because of, or in response to, the Project. Mine projects are quite different from other types of projects, such as infrastructure projects (e.g., power generation and distribution, road and bridge construction, or rail and port-related projects), which can be expected to have "knock-on" cumulative-incremental effects because they more broadly support future regional economic development.

The only potential project (i.e., cumulative-incremental effect in this secondary sense) of relevance that might be foreseen would be a metal refinery or smelter. However, the likelihood of this type of project is remote given the economies of scale that are necessary to make such a facility viable. The Brucejack Gold Mine Project on its own will not have sufficient output to warrant the level of investment necessary to bring a processing facility or similar on line. Consideration of the cumulative-incremental effects of other projects towards this sort of indirect or induced development is beyond the purview of this assessment given the lack of available information on other projects. As such, the concept of a metal refinery or smelter is not carried forward in this assessment.

2.3 RESEARCH APPROACH AND ACTIVITIES

The scope of work designed to meet the requirements listed above (Section 2.2) and fulfill the objectives of the Project ESCIA study was developed with the input and approval of the NLG, and past ESICA reports informed by the CEA Agency, and BC EAO. The work consisted of five main activities as described below.

2.3.1 Baseline Conditions Update

Social, economic, and population baseline information was derived from the relevant baseline reports prepared for the Brucejack Gold Mine Project Application/EIS. Specifically, this included new data from Canada Census 2011 and related analyses (e.g., from Aboriginal Affairs and Northern Development Canada or BC Stats) on community demographics, labour force (including levels of employment/unemployment and employment by sector), and housing. Key person interviews (Section 2.3.3) were used to update or supplement available secondary data and fill gaps in the information. The updated summary of baseline information is presented in Appendix 1.

2.3.2 Gap Analysis/Reanalysis of SERC and Nisga'a Business Survey Results

A gap analysis and re-evaluation of the statistical reports and qualitative data that accompanied the SERC and Nisga'a Business Surveys was carried out. The review was informed in part by feedback and comments received from NLG, BC EAO, and the CEA Agency on the two previous ESCIA reports.

Many of the questions in the original surveys had additional qualitative commentary which was also reviewed and re-evaluated in the context of the Brucejack Gold Mine Project. Additional statistical analysis was unnecessary and was not carried out for the purposes of this assessment.

2.3.3 Key Person Interviews

Interviews were necessary to support ongoing research and provide additional firsthand knowledge on a number of key issues relevant to the study and to update and supplement information from secondary sources and official statistics, fill gaps, and provide additional context. A select number of key persons within NLG, the Nisga'a village governments, and other informed individuals were identified with the assistance of NLG and senior village government representatives. The results of the key person interviews carried out for the Brucejack Gold Mine Project ESCIA report were used in conjunction with the results of similar research carried out for the Kitsault Mine Project and the KSM Project.

A field trip to the Nass Valley and the Nisga'a villages of Gitlaxt'aamiks and Laxgalts'ap took place January 22 to 24, 2014. At the request of Nisga'a participants, group interviews were held with Gitlaxt'aamiks Village Government councillors and senior program directors (eleven participants), the Superintendent of School District 92 and senior staff (two participants), and Councillors and representatives of the Council of Elders for the Village of Laxgalts'ap (four participants). Informal discussions were also held with other Nisga'a citizens, Elders, and senior staff of Laxgalts'ap Village Government.

The objectives of these interviews were to: (i) update and confirm socio-economic baseline conditions, (ii) gain additional insight into Nisga'a perceptions about the potential impacts of the Project on community services and facilities, and (iii) gather firsthand knowledge on the capacity of various community services and facilities to cope with additional demand.

The specific subject matter of the questions reflected interviewees' specific area of knowledge, responsibility, and experience in one or more of the following areas:

- housing;
- community infrastructure and services (e.g., water supply, sewage or recreation facilities);
- education services and facilities;
- health and social services and facilities; and
- emergency and public safety services.

Questions concerning general perceptions on the capacity to adapt to population increases and related changes or pressures on community services and resources were also explored.

2.3.4 Scenarios of Cumulative and Incremental Effects

The scenarios of cumulative and incremental effects were updated from the previous ESCIA reports to reflect current project information and with the inputs from the proposed Brucejack Gold Mine Project. The projects used to frame each scenario of low, medium, and high development are as defined in Section 2.2. These projects have been checked and assumptions about scale and timing updated as appropriate. There was discussion with NLG about including in the development scenarios one of the proposed pipeline projects associated with LNG facilities that is also currently undertaking ESCIA studies. It was mutually agreed upon with the NLG that an LNG project would not be included in the development scenarios because doing so did not add value to the analysis, as the purpose of the scenario analyses (i.e., examining the potential cumulative impacts of a range of development scenarios) was otherwise achieved.

2.3.5 Updated Case Study Review of Aboriginal Experiences with Mining in British Columbia

An expanded review of recent literature concerned with the experiences of Aboriginal peoples and the mining sector was carried out with a focus on examples from British Columbia as per NLG comments on previous ESCIA reports. The results are summarized in Appendix 2 which reviews recent literature on impacts and benefits agreements (IBAs) and looks at specific experiences with

various mine exploration and mine development activities that have taken place within traditional territories of the Tahltan and Takla First Nations. Similar documented information is not readily available as it applies specifically to the Nisga'a Nation.

2.4 MITIGATION AND MANAGEMENT MEASURES

Mitigation and predicted residual effects of the Project are presented and discussed in the Brucejack Gold Mine Project Application/EIS (report dated January 2014). The current report does not discuss the details of mitigation, management planning or monitoring for identified Project effects, nor does it provide conclusions regarding the significance of residual effects. With respect to the latter, the reader is directed to the Brucejack Gold Mine Project Application/EIS.

In sum, key mitigation as described in the Application/EIS includes:

- Communications with NLG – Pretivm will share Project information, including timing of major activities and key milestones, workforce requirements and the hiring schedule (including types of experience and qualifications required to work at the Project), workforce rotation schedule, workforce recruitment process, transportation activities, and overall operations. Communication activities will also include formal, clear, and transparent communications with NLG and others in advance of when Closure is going to occur so that affected Project contractors and local business employees are able to adjust accordingly, and activities will be formalized through workforce transition programs.
- Communications with educational institutions – Pretivm will inform NLG, regional, and local educational institutions (including Wilp Wixo'xskwhl Nisga'a Institute), as appropriate, on the Project development schedule and workforce requirements to encourage educational institutions to ensure that relevant programs are available within the communities, including Nisga'a villages, for residents to take advantage of training and education opportunities relevant to Project employment. Communications are to provide educational institutions throughout the region with early notice with respect to workforce job categories, the workforce schedule, and training needs to assist administrators in taking pro-active steps to prepare resources to meet the demand. Pretivm will promote and support mining-related training and education for Aboriginal groups as led and implemented by educational institutions within the region. These efforts are expected to assist individuals in overcoming pre-existing barriers to reaching higher levels of education and skill attainment.
- Human resources policies and programs – Hiring practices will follow BC and federal legislation and regulations with a focus on hiring local and regional residents, where possible, in consultation with NLG. Human resource policies will clearly identify expected employee behaviours. Pretivm will have programs in place to assist employees who are experiencing work or family stress, or who may be experiencing difficulty with poor lifestyle choices, such as an Employee Assistance Program, or will connect workers to external service organizations that have such programs.

In addition, Pretivm intends to pursue the development of a Benefits Agreement with the Nisga'a Nation in connection with the Project. The material components of such an agreement may include

economic benefits, employment and contracting opportunities, and ongoing engagement. It is expected that the Benefits Agreement would address the mitigation of adverse effects and enhancement of benefits from the Project. This is expected to includes measures to address some of the barriers Nisga'a community members face with respect to gaining higher levels of education and skill attainment, and support of pre-existing government training initiatives in order to maximize their effectiveness. This would be an additional mechanism through which management planning would occur.

The current report is focused on provision of detailed technical analysis of the potential economic, social, and cultural impacts of the Project on Nisga'a citizens and Nisga'a Lands as detailed in the ESCIA Guidelines. Assumptions are made regarding mitigation and management planning that are consistent with the statements made in the Brucejack Gold Mine Project Application/EIS.

3. SCOPE OF THE ASSESSMENT

This section describes the process used to establish and define the interactions between anticipated Project effects and the economic, social, and cultural attributes and issues of concern identified in the ESCIA Guidelines. The broad areas of concern defined in the ESCIA Guidelines are broken down into discrete resources or receptors, henceforth defined as VCs, following established environmental impact assessment practice in British Columbia (BC EAO 2013). The scoping process for the assessment of economic, social, and cultural impacts involved several steps:

a) identification of discrete economic, social, and cultural VCs based on a consideration of the broad areas of concern described in the ESCIA Guidelines;

b) definition of spatial and temporal boundaries for the assessment of economic, social, and cultural impacts on established VCs;

c) identification and consideration of anticipated potential interactions between Project-related effects on population, employment, income, work schedules, and other dimensions of Nisga'a life relevant to the identified VCs; and

d) identification of key potential Project effects on economic, social, and cultural VCs.

These steps often took place concurrently and were not necessarily carried out in sequence. The outcomes of the scoping process are described according to the broad economic, social, and cultural issues or areas of concern as identified in the ESCIA Guidelines.

3.1 SELECTION OF VALUED COMPONENTS

VCs are used to focus the assessment on issues of greatest concern. VCs are specific attributes of the biophysical and socio-economic environments that have environmental, social, economic, heritage, or health importance. To be considered for assessment, a component must be of recognized importance to society, the local community, or the environmental system, and there must be a perceived likelihood that the VC will be affected by the proposed Project. The VCs defined for this assessment are derived from the issues and areas of concern identified for analysis in the ESCIA Guidelines.

Pursuant to the NFA, and as stated in the ESCIA Guidelines (see Section 1.1), Table 3.1-1 identifies the key economic, social, and culture issues/areas of concern to Nisga'a Nation. In some cases the ESCIA Guidelines further refine these broad areas of concern in to more specific issues or items which are categorized here as VCs. Where such clarification or refinement was explicit in the ESCIA Guidelines specific VCs were identified to provide an appropriate level of measurement and analysis.

In addition to the VCs identified in Table 3.1-1, the ESCIA Guidelines identify population and demographic change as an issue of concern. Population and demographic change is both a potential effect of the Project, and broader regional economic development, and a driver or cause of other social effects. Migration and population change is defined as a "pathway" or intermediate effect. Population demographics, including modeled projections of potential migration and population

change, is discussed in detail in Section 4. Migration and population are not assessed as either a beneficial or adverse effect of the Project *per se*; instead, population and migration projections are used as a basis for the assessment of other social effects.

Table 3.1-1. Valued Components Identified for the Impact Assessment

Areas and Issues of Concern	Valued Component
Economic Impacts	
Nisga'a employment and income	• Nisga'a employment • Nisga'a income
Nisga'a business activity and earnings, and investment activity	• Nisga'a business capacity and investment • Nisga'a business revenue
Nisga'a natural resource activity and related earnings or value	• Availability and accessibility of resources • Natural resource activity employment • Natural resource activity income
Nisga'a Government revenues and expenditures	• NLG expenses (in relation to participation in EA process, Project monitoring) • NLG revenue (in relation to revenue sharing agreements, potential Benefits Agreement)
Future Nisga'a Nation economic opportunities and economic development	• A longer term impact on "Nisga'a employment", "Nisga'a income", "Nisga'a business revenue"', and "Nisga'a business capacity and investment"'
Social Impacts	
Infrastructure and services	• Housing • Community infrastructure • Quality and capacity of social services (including health, education, and emergency services)
Occupational and non-occupational health risks	• Nisga'a worker health (in the context of Project-related environmental impacts) • Nisga'a citizen health (in the context of Project-related environmental impacts)
Occupational and non-occupational accident risks	• Nisga'a worker health (in the context of Project activities and transportation) • Nisga'a citizen health (in the context of Project activities and transportation)
Social problems (e.g., increased domestic issues, substance abuse, crime)	• Community well-being
Cultural Impacts	
Nisga'a cultural activities and practices	• Culturally important resources and sites • Participation in cultural activities and practices • Nisga'a language

3.2 SPATIAL AND TEMPORAL BOUNDARIES

The study area for this report includes all of the Nass Area, which encompasses the Nass Wildlife Area (NWA), Nisga'a Lands, and Nisga'a fee simple lands as defined by the NFA. The study focuses in particular on the four Nisga'a villages of Gingolx, Laxgalts'ap, Gitwinksihlkw, and Gitlaxt'aamiks located along the lower Nass River, but also considers Nisga'a citizens living in Terrace, Prince Rupert/Port Edward, and Vancouver.

The temporal boundaries of the study are defined by four distinct phases of the Project as follows:

- Construction: 2 years;
- Operation: 22 years;
- Closure: 2 years (includes project decommissioning, abandonment and reclamation activities); and
- Post-closure: minimum of 3 years (includes ongoing reclamation activities and post-closure monitoring).

For the purposes of social, cultural and economic impact assessment the final two phases of the Projects are considered jointly. While there are distinct socio-economic implications related to the Project during construction and operation (e.g., more employment) and even more distinct implications when the Project ends (e.g., loss of employment), the distinction between closure and post-closure is relatively minor. For the purposes of this report there is little to be gained either analytically or from a mitigation and management standpoint, from an independent assessment of the two latter phases of the Project.

3.3 IDENTIFICATION OF POTENTIAL INTERACTIONS

A VC-scoping exercise based on the ESCIA Guidelines and NLG feedback was carried out to explore potential Project interactions with candidate VCs and to identify key potential adverse effects associated with each interaction.

Table 3.3-1 provides an impact scoping matrix of Project components and activities and proposed economic, social, and cultural VCs (Table 3.1-1). Potential interactions between the Project and VCs are coded according to the level or degree of interaction and the perceived likelihood of some sort of adverse (or beneficial) effect. The basis for this "pre-assessment" of interaction and impact includes previous environmental assessments and ESCIA reports, past experience, and professional judgement. Colour coding denotes a subjective determination of level or degree of interaction as follows:

- light grey: potential Project-VC interaction is minimal (if at all) and unlikely;
- dark grey: potential Project-VC interaction is possible but unlikely to have a noticeable or discernible effect; and
- black: Project-VC interaction is probable and discernible Project impacts are likely.

Table 3.3-1. Potential Interactions of Project Components and Physical Activities with Economic, Social, and Cultural Valued Components

Valued Component	Project Phase		
	Construction	Operation	Reclamation, Closure, and Post-closure
Economic			
Nisga'a employment			
Nisga'a income			
Nisga'a business revenue			
Nisga'a business capacity and investment			
Availability/accessibility of resources			
Natural resource activity employment			
Natural resource activity income			
NLG expenses			
NLG revenue			
Social			
Housing			
Community infrastructure			
Medical, education, emergency and social services			
Nisga'a worker health (in the context of Project-related environmental impacts)			
Nisga'a worker health (in the context of Project activities and transportation)			
Nisga'a citizen health (in the context of Project-related environmental impacts)			
Nisga'a citizen health (in the context of Project activities and transportation)			
Community well-being			
Cultural			
Quality of and access to culturally important resources and sites			
Participation in cultural activities and ceremonies			
Nisga'a language			

Light grey = unlikely interaction between project components/physical activities and valued component; unlikely contribution to cumulative impacts.
Dark grey = potential interaction between project components/physical activities and valued component; possible contribution to cumulative impacts.
Black = probable interaction between project components/physical activities and valued component; probable contribution to cumulative impacts.

Interactions coded light-grey are considered unlikely to have adverse or beneficial effects on the corresponding VC and are, therefore, not considered further in the assessment (Section 3.1.2.1).

Interactions coded dark-grey might have some adverse or beneficial effect, although it is expected that such effects will be difficult to measure and would require careful monitoring to be able to detect such impacts. Nevertheless, the potential for some effect is sufficient to warrant further consideration in the assessment. These interactions may also contribute to broader cumulative impacts.

Interactions coded black are expected to have some adverse or beneficial effect on Nisga'a citizens and communities and are further assessed.

3.4 IDENTIFYING POTENTIAL EFFECTS

There are a variety of potential economic, social, and cultural effects of the Project on Nisga'a citizens and communities. Many Project effects are interlinked and are likely to have both positive and negative dimensions. A single Project element or activity may have distinctly different economic, social and cultural impacts. The Project is relatively far removed from the Nisga'a communities and, therefore, is likely to have limited, direct physical interaction with Nisga'a citizens or communities. Physical or environmental effects would interact with Nisga'a citizens and communities mainly through impacts to access and/or quality of culturally important species or places. Economic effects and related changes in population would interact with numerous aspects of social and economic conditions. Some Project interactions have clear, identifiable potential effects, others will be more subtle. Project-related changes in population and/or income (individual, household or community) are characterized as intermediate effects which in turn affect other dimensions of Nisga'a economy and society (see Section 4).

Based on the potential interactions identified in Table 3.3-1, the following potential economic effects are reviewed for inclusion in this assessment:

- increased employment for Nisga'a citizens living both in Nisga'a villages and outside Nisga'a Lands (e.g., Terrace);
- increased income levels in Nisga'a villages and among Nisga'a citizens living outside Nisga'a Lands;
- increased business activity and income for Nisga'a businesses in the villages and potentially those owned by Nisga'a citizens living outside Nisga'a Lands (primarily in Terrace);
- increased business capacity and investment (more and/or better equipment; technology and systems improvements; experience, skills, and training gains by/for business management and staff);
- increased staffing and administration costs for the NLG due to participation in pre-Application and Application review and monitoring activities;
- increase in NLG income from revenue sharing with province and/or through IBA with Proponent (possible implications under terms of Nisga'a Own Source Agreement);
- availability and accessibility of natural resources;

- natural resource-related employment; and
- natural resource-related income.

Based on the potential interactions identified in Table 3.3-1, the following potential social effects are reviewed for inclusion in this assessment:

- increased demand and pressure on available housing;
- changes to community well-being, including consideration for crime levels and domestic problems and/or family breakdown (e.g., divorce/separation, domestic violence, children/youth in care, substance abuse);
- increased demand for community social services (including education services, as well as police, medical, and/or fire protection services);
- exposure to occupational and non-occupational health risks related to mining; and
- exposure to occupational and non-occupational accident risks related to mining.

Based on the potential interactions identified in Table 3.3-1, the following potential cultural effects are reviewed for inclusion in this assessment:

- reduced ability of Nisga'a citizens and Nisga'a mine workers to access culturally important resources and sites; and
- reduced ability of Nisga'a citizens and Nisga'a mine workers to participate in culturally important activities and ceremonies.

The potential effects of the Project named above are further considered for inclusion in the assessment based on their potential interaction with ESCIA VCs. Each effect is considered in relation to the temporal and spatial boundaries of the Project and is further discussed below.

3.4.1 Rationale for Inclusion or Exclusion of Valued Components

Based on findings and experience gained from previous ESCIA reports, baseline information updates, gap analysis, selected key informant interviews, and feedback from NLG, BC EAO, and CEA Agency this section provides a rationale for inclusion or exclusion of each VC identified in Table 3.3-1.

3.4.1.1 Valued Components Excluded from the Assessment

Community Infrastructure

Community infrastructure refers specifically to those physical elements that support the proper functioning of the community, including roads, water, sewer, electricity, and communications. Housing is considered separately from Community Infrastructure (see Section 3.4.1.2). Subsequent to the signing of the NFA, Nisga'a have used funds allotted under the terms of the treaty for maintenance and upgrades of existing infrastructure and to invest in capital projects (NLG 2009).

Project activities, including transportation along public highways, are well-removed from Nisga'a villages and are, therefore, not expected to have any impact on community infrastructure. The only source of interaction and potential impact on community infrastructure on Nisga'a Lands is population increase due to migration of Nisga'a citizens (and possibly others) to, or back to, one of the Nisga'a villages because of job or other economic opportunity linked to resource development projects. In general, community infrastructure has existing capacity to meet the needs of a population larger than the current population living on Nisga'a Lands. Even under high development assumptions, modeled population changes (Section 4) based on SERC Survey results are modest (<1% per annum) and unlikely to have an appreciable impact on the quality, availability or functionality of community infrastructure. There is one exception to this. According to information received in the group interview held with Gitlaxt'aamiks Village Government councillors and senior staff January 22, 2014 the water and sewage systems of that community are approaching capacity (See Section 6.3). Baseline research indicates that water and sewage systems in Gitwinksihlkw and Gingolx have recently received upgrades and have the capacity to service an expanding population.

ESCIA Guidelines also request an analysis of Project impacts related to potential enhancements or improvements to community infrastructure that may arise due to Project-related demand or opportunities. Business income, employment, and NLG revenues generated through involvement in projects might enable Nisga'a governments and citizens to undertake infrastructure improvements. Furthermore, project-induced migration and population increases could create internal demand within Nisga'a villages and subsequently spur investment in the upgrade and enhancement of infrastructure and services. While certainly possible, infrastructure and service upgrades of this nature are considered an unlikely effect of the Project due to its size, duration, and location in relation to Nisga'a villages. There is more reason to believe that such improvements may be realized over a longer time horizon due to the cumulative impacts of increasing resource development in the region. As the Project is not expected to enhance or improve community services and infrastructure through Project-related demand and opportunities, the VC Community Infrastructure is only considered in relation to water and sewer services at Gitlaxt'aamiks.

Nisga'a Citizen Health and Accident Risks

Health risks are defined in the Nisga'a ESCIA Guidelines with specific reference to Project-related environmental impacts, "on air and water quality, or other impacts giving rise to health-related concerns that are identified in the environmental assessment" (NLG 2010). Accident risks are defined with specific reference to, "transport and occupational activity resulting from the Project and the accident risk factors they entail [and] estimates of the number of injuries and loss of life…expected…based on the geographical distribution of transport risk…" (NLG 2010).

The remoteness of the Project from the Nisga'a villages, the permit requirements that must be met for both air and water emissions from the Project, and the absence of Project-related transportation using Nisga'a public roadways means that health and accident risks for Nisga'a citizens are negligible. The cumulative impacts of multiple projects conceivably could increase the risk of accidents and health risks, especially in consideration of the Kitsault Mine Project which proposes to traverse a portion of Nisga'a Lands to access the site and ship out concentrate. Overall, the development of the Project is not expected to result in changes to Nisga'a citizen health and accident risks. As such, the VC Nisga'a Citizen Health and Accident Risk' is not considered further.

Nisga'a Language

Findings from the 2011 SERC Survey and focus groups carried out in 2012 suggest that from a Nisga'a perspective there is not a meaningful, cause-effect relationship between project development in the region and the use or preservation of Nisga'a language. The issue is twofold. One concern is that Nisga'a citizens who choose to work on mining projects will be exposed to an English dominated environment and would, therefore, have less opportunity while at work to engage with the Nisga'a language. For the vast majority of Nisga'a this is also the case elsewhere, including most occupations on Nisga'a lands. The other concern is that an influx of population to Nisga'a villages is likely to bring more English speakers. While it is true that neither working at the mine site, nor the possible influx of outsiders (whether Nisga'a or not) to Nisga'a Lands, is likely to enhance the use of Nisga'a language, there is no evidence to suggest that these factors will appreciably increase the pressure on Nisga'a language.

SERC Survey results suggest that Nisga'a language is relatively healthy compared to other Aboriginal languages in British Columbia. Group interviews highlighted a widely held view that the fate of Nisga'a language is an internal, Nisga'a concern and that the pressures on its continued use and survival are a function of broader societal forces (e.g., globalization, the spread of technology, and the increasing use of social media) rather than due to the influence of a single, or even multiple, projects. Overall, the development of the Project is not expected to pose a challenge to the continued maintenance of the Nisga'a language or to any language development initiatives. As such, further assessment to the VC Nisga'a Language is not warranted.

3.4.1.2 Valued Components Included for Further Assessment

Table 3.4-1 below summarizes those VCs carried forward in the assessment, indicating the main anticipated effects and the principal pathways through which Project activities and components are expected to potentially cause such effects.

Table 3.4-1. Valued Components Included for Further Assessment

Valued Components	Rationale for Inclusion	
	Key Anticipated Effects	Driver or Cause
Economic Impacts		
Nisga'a Employment	• Increased employment for Nisga'a citizens living both in Nisga'a villages and outside Nisga'a Lands (e.g., Terrace)	• Project direct, indirect, and induced employment
Nisga'a Income	• Increased income levels in Nisga'a villages and among Nisga'a citizens living outside Nisga'a Lands	• Relatively higher wages and salaries from Project direct and indirect employment
Nisga'a Business Revenue	• Increased business activity and income for Nisga'a businesses in the villages and potentially those owned by Nisga'a citizens living outside Nisga'a Lands (primarily in Terrace)	• Project direct, indirect, and induced demand for goods and services

(continued)

Table 3.4-1. Valued Components Included for Further Assessment (continued)

Valued Components	Rationale for Inclusion	
	Key Anticipated Effects	Driver or Cause
Economic Impacts *(cont'd)*		
Nisga'a Business Capacity and Investment	• Increased business capacity (more and/or better equipment; technology and systems improvements; experience, skills, and training gains by/for business management and staff) • Increased ability of businesses to invest in equipment, facilities, and workers	• Generation of revenue and profits from successfully fulfilling Project-related supply and service contracts
NLG Expenses	• Increased staffing and administration costs due to participation in pre-Application and Application review, and monitoring activities	• Federal consultation requirements • Protection of Nisga'a interests
NLG Revenue	• Increase in NLG income from revenue sharing with province and/or through IBA with Proponent; possible implications under terms of Nisga'a Own Source Agreement	• Depends on the occurrence and outcome of negotiations between relevant parties • Pursuant to the NFA and terms of the Nisga'a Own Source Agreement[1]
Nisga'a Natural Resource Related Earnings or Value	• Availability and accessibility of resources • Natural resource related employment • Natural resource related income	• Project-related environmental impacts on harvested natural resources, and/or Project-induced competition for labour with Nisga'a natural resource businesses
Social Impacts		
Housing	• Increased demand and pressure on existing housing stock	• Project-induced migration and population change
Community Well-being	• Increased prevalence of undesirable community and family characteristics (e.g., divorce rates, domestic violence, children/youth in care, substance abuse) • Changes to crime levels (e.g., serious, property, juvenile) • Changes in access to community services (e.g., mental health and substance abuse programs)	• Newcomers in the community due to Project-induced migration and population • Worker absence from family and community due to mine shift work • Resource industry incomes, leading to injection of disposable income (i.e., issues around poor financial management and spending choices)

(continued)

Table 3.4-1. Valued Components Included for Further Assessment (completed)

Valued Components	Rationale for Inclusion	
	Key Anticipated Effects	Driver or Cause
Social Impacts *(cont'd)*		
Community Services (including health, education, and emergency services)	• Increased demand for community social services • Increased class size (i.e., decline in the teacher-student ratio) • Increased demand for police, ambulance, and/or fire protection services	• Project induced migration and population • Worker absence from family and community due to mine shift work • Resource industry incomes, which tend to be higher than other locally and regionally available employment
Nisga'a Worker Health (in the context of Project related environmental impacts)	• Exposure to occupational health risks related to mining	• Nisga'a workers at mine-site exposed to impacts on air and water in the vicinity of the Project
Nisga'a Worker Health (in the context of project activities and transportation)	• Exposure to occupational accident risks related to mining	• Nisga'a workers at mine site and along transportation routes exposed to accident risks
Culture Impacts		
Culturally important resources and sites	• Reduced ability of Nisga'a citizens and Nisga'a mine workers to access culturally important resources and sites	• Mine activities and components reducing or eliminating availability and/or access to resources
Participation in cultural activities and practices	• Reduced ability of Nisga'a citizens and Nisga'a mine workers to participate in culturally important activities and ceremonies	• Mine shift work preventing Nisga'a workers from participating in time sensitive or seasonal activities

[1] *"The Own Source Revenue Agreement sets out how the Nisga'a will contribute to the costs of Nisga'a government and has an initial term of 12 years. The proportion of the costs of Nisga'a government and services paid by British Columbia and Canada will reduce over time as the Nisga'a contribute from tax and fee revenues, interest on treaty settlement payments, and business and investment activities, including natural resource management. Nisga'a citizens will also support their government services indirectly through taxes paid to British Columbia and Canada."*
Source: http://www.gov.bc.ca/arr/firstnation/nisgaa/agreements/own.html (accessed February 25, 2014).

4. NISGA'A MIGRATION AND POPULATION

The ESCIA Guidelines state that the assessment of social impacts is to include consideration of the Project's influence on population migration in to, or away from, Nisga'a villages and of any potential changes to the demographic make-up of Nisga'a villages including the distribution of Nisga'a and non-Nisga'a citizens. Migration and population change is best understood as an intermediate or pathway effect (see Section 2.2.2) of the Project that in turn has potential implications for other social VCs (Section 6) and, to a degree, cultural VCs (Section 7).

The BC Stats Population Extrapolation for Organizational Planning with Less Error (PEOPLE) model provides projections of demographic change based on data from the 2006 Canada Census and a number of provincial scale assumptions about future migration, fertility, and mortality. Projected changes in the Nisga'a villages in absence of the projects consider the demographic trends evident for Aboriginal communities in BC. The specific impacts of mine development and other projects in northwest BC on potential migration to and from the Nisga'a communities are then estimated with the projects as an additional driver of demographic change. This assessment is based on an alternative forecast of demographic change developed from SERC Survey data and modified assumptions about natural population change.

The population model developed for this study uses data obtained from questions asked of Nisga'a citizens about their current (i.e., summer/fall 2011, when the survey was conducted) intentions to move, either to/back to or away from the Nass, and about how these intentions might be modified by mining development in northwest BC in general and the prospect of mine related employment in particular. The data do not provide information on the specific influence of one mine versus another.

The BC Stats PEOPLE model forecast provides a relatively conservative projection of population change. The results from the SERC Survey suggest more volatile migration of Nisga'a citizens both to and away from Nisga'a villages and, overall, a higher net in-migration. Although there is greater uncertainty in the population and migration estimates, it provides a basis for considering the implications, both beneficial and adverse, of higher, project-related population changes.

4.1 THE PULL OF MINE-RELATED OPPORTUNITIES

Employment, contracting, and business opportunities, linked to Project demand for workers and supplies during the construction and operation phases, are an incentive for people living outside northwest BC to move into the region. The trend in contemporary mining projects in remote areas of BC is to establish work camps at the mine site to house workers at the mine for typically a two week shift. Employees are flown or bussed from their home communities in the region or from more distant centres such as Vancouver or Edmonton. If people decide to relocate from outside northwest BC to be closer to the job site, it is likely they would move to larger communities such as Terrace, Prince Rupert, or Smithers, which offer more services than are typically available in small communities such as the Nisga'a villages. This is almost certainly the case for non-Nisga'a people, but potentially for Nisga'a as well, because there is little or no geographic advantage to living in the Nisga'a villages compared to elsewhere in the region. Given contemporary fly-in/fly-out practices, a

small community situated relatively close to a mine has no obvious advantage for mine workers over a larger regional centre that is farther away from the project.

One exception relevant to Nisga'a might be Avanti Mining Inc.'s Kitsault Mine Project, which is much closer to the Nisga'a communities than the other mines currently proposed in northwest BC. If it is assumed that the people most likely to move to the Nisga'a villages, from Terrace or Prince Rupert where many Nisga'a live, or from farther afield, are those who have social ties in the villages and/or those whose decision to move back hinges mostly on the availability of employment opportunities.

The analysis of Nisga'a employment (Section 5.2) provides a basis for the assumption that there will be sufficient incentive to draw some Nisga'a citizens living outside of the Nass Area to move to (or back to) one of the Nisga'a villages. Estimating the scale of such migration is uncertain and contingent on numerous factors that cannot be predicted. The evaluation of migration discussed below is based on data generated by the SERC Survey and supported by feedback and information generated through focus groups, interviews, and secondary sources.

4.2 ESTIMATING MIGRATION AND POPULATION CHANGE

Population projections of the PEOPLE model for the Local Health Area 92 (LHA 92 Nisga'a) forecasts the Nisga'a population will continue to grow at a modest rate of about 0.3% until the late 2020s when it is projected to peak at around 2,038 inhabitants. After 2027 the population is forecast to decline slowly at first and then more rapidly. By 2036 at the end of the model period it is projected there will be fewer people living in the Nass than there are now (BC Stats 2013b). The forecast is built upon consideration of past population trends and area specific assumptions about fertility, mortality, and migration.

The SERC Survey explored the reasons and motivations that lie behind people's intentions to move to, or away from, the Nisga'a villages irrespective of mining development to give a baseline of current migration tendencies. In a series of follow up questions the survey aimed to evaluate the demographic effects of mining projects.

Residents of the Nisga'a villages were asked how the prospect of mining development in the region would influence their intentions to either move away or stay in the Nass. Some people were intending to leave the Nass within five years and did not think that the opportunity for mining employment would change that decision. Reasons for moving away included pursuit of post-secondary education, work opportunities or family. For those whose intention to move was increased by the prospect of mine development additional reasons for moving included work at a mine, pursuit of other work opportunities, and concerns about pollution and environmental hazards related to mining activity.

It is assumed that those Nisga'a village residents who would move away for mine employment may have misunderstood the question and/or they were unaware that contemporary fly-in/fly-out shift rotation practices means that it is generally not necessary to leave one's home community for the purposes of working at a mine. For purposes of the model, therefore, projections of the number of people expected to leave the Nass Area in the event of the mine going ahead were based only on the

proportion of people who would move for perceived environmental hazards and/or pollution concerns. The net effect is that estimates of migration are likely to illustrate the upper range of net in-migration to the Nass Area as a result of mining development because some people who said they would leave for other reasons, such as to attend school, may be expected to follow through with their intentions despite any potential mine employment opportunity.

The intentions of Nisga'a citizens living outside of the Nass Area to move to (or back to) one of the Nisga'a villages were also modeled. The results of this analysis yielded several different projections of how the population might change in response to mining development in the region.

Projections of the number of people expected to move back to the Nass Area, in the event that a proposed mine project proceeds, were developed from analysis of a series of questions in which respondents were asked: (a) about their intentions to move back to the Nass Area (or not) in the next five years, regardless of whether or not a mine existed; (b) how many family members would move with them; and (c) about the likelihood of them moving to (or back to) the Nass Area if the mine were to go ahead. The proportion of respondents who were more likely to move to the Nass Area in the next five years if a mine was developed provides the basis for projections of mine-induced in-migration to the Nass Area.

The projections provided here, and upon which the remainder of the socio-economic and cultural impact assessment is based, include the following core assumptions about population change:

a) The natural population growth rate of Nisga'a citizens will be roughly double the current natural rate of population growth of the general population in BC.

b) Although the SERC Survey asks a static question about people's intentions to move to the Nass Area, the population projections developed here assume a linear progression of ongoing migration of people over time, both into and away from the Nass Area.[3]

c) For simplicity the proportion (i.e., percentage) of people moving in or out of the Nass Area, as reported in the survey, is applied annually (hence the linear projection of population growth/decline).

d) As a result of the assumption defined in (c) the number of people leaving the Nass Area increases in proportion to the growth of the Nisga'a population living in the Nass Area while the number of people coming to the Nass decreases in proportion to the decline of the Nisga'a population living outside the Nass Area.[4]

e) Year one in the models is 2015.

[3] Respondents were asked to gauge their intention to move back within the next five years. The percentage of people who were already highly likely to move back and whose likelihood of moving back increased in the event of the mine going ahead was divided by five to give an annualized migration rate which was then applied to the total Nisga'a population.

[4] For example, as Nisga'a citizens move back to the Nisga'a villages, the total pool of Nisga'a citizens living outside Nass Area declines. Thus, if 2% of the population is expected to migrate back to the Nass on an annual basis, 2% of the remaining number of Nisga'a living outside the Nass will be a lower number each year than in the preceding year.

Two scenarios of migration were developed from the SERC Survey results to illustrate the potential movement of people and provide a basis for evaluation of other social and cultural impacts related to mining development. The projections illustrate scenarios of high and moderate net in-migration (Figure 4.2-1) while the forecast of the BC Stats PEOPLE model presents a low net in-migration scenario which includes the possibility of eventual de-population. This assessment does not consider the social, economic, and cultural implications of this low end scenario because it is less relevant to the issues and concerns identified in the Nisga'a ESCIA Guidelines (NLG 2010).

The high net in-migration scenario projects that net in-migration to the Nisga'a villages could be as high as 22 to 25 people per year (including accompanying family members) during construction and the first few years of operation. This number will drop to about 16 to 18 people per year at the mid-point of the operation phase (approximately the year 2027) and to about 13 to 14 people per year at the end of the mine life around 2038. This level of migration could pose some challenges for Nisga'a communities and, at the same time, generate positive outcomes for the communities as well (see Section 6).

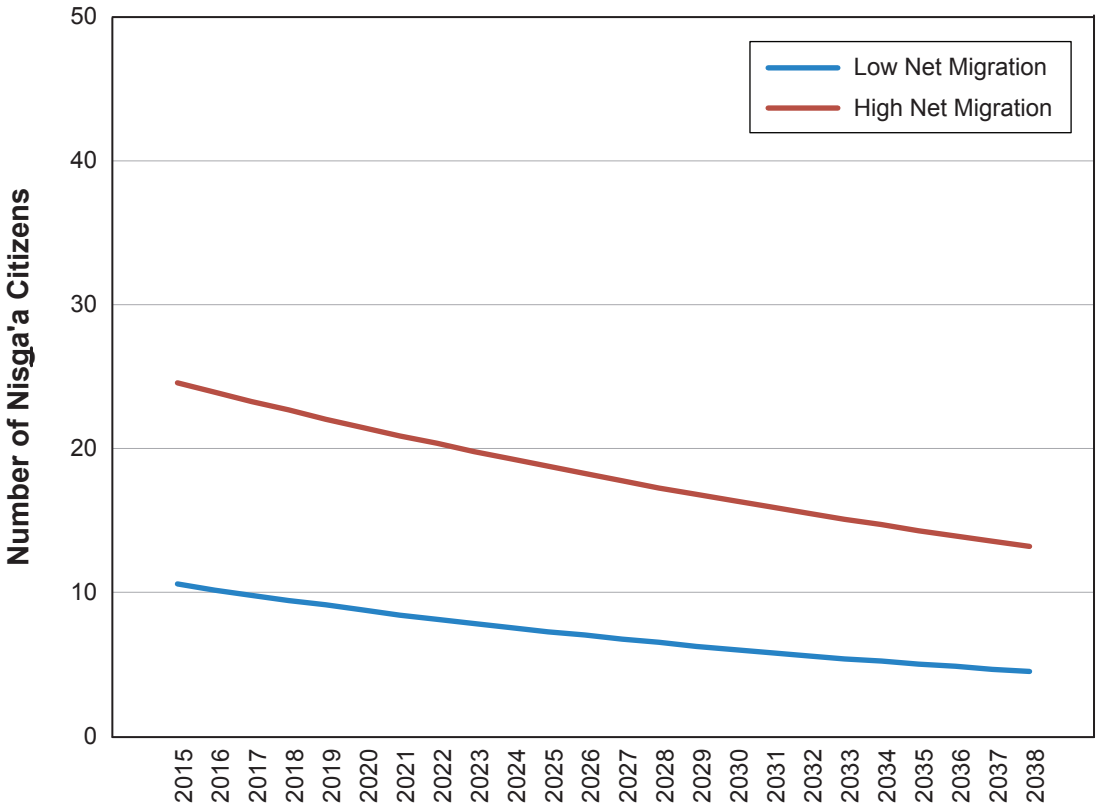
The moderate net in-migration scenario projects that net in-migration to the Nisga'a villages will be about 9 to 11 persons per year (including accompanying family members) during construction and the first few years of operation. This number will drop to about 6 to 7 people per year at the mid-point of the operation phase (approximately year 2027) and to about 5 people or fewer per year at the end of the mine life around 2038. In terms of social and economic change, it is expected that this level of population increase would be manageable and likely to have more positive than adverse effects on Nisga'a citizens and communities (see Section 6).

The "pull" of mining projects on its own may not draw many people to the Nass Area; however, in the more likely context of multiple projects taking place in the region, economic modeling suggests a stronger demand for labour and increased opportunities for Nisga'a to find mine employment (see Section 5). Based on the SERC Survey results, the prospect of mine employment will potentially draw more people to the Nass Area than are expected to leave for both mine and non-mine related reasons.

Finally, from the results of the SERC Survey a multiplier is derived based on survey answers that projects the number of people likely to accompany an individual who decides to migrate to or from Nisga'a Lands. Model projections suggest that each person inclined to move to (or back to) Nisga'a Lands will be accompanied by fewer additional people (e.g., spouses, children or other relatives) than those persons expected to emigrate from Nisga'a lands. In other words, by almost a factor of two, there is likely to be a bigger loss to the community due to someone moving away, than there is a corresponding gain to the community from someone moving in.

Figure 4.2-1

Low and High Migration Scenarios, 2015 to 2038



4.3 DISCUSSION OF MIGRATION SCENARIOS

In reality, net annual in-migration is unlikely to follow the linear path indicated in any of the three scenarios projected by either the BC Stats PEOPLE model or the model based on the results of the SERC Survey (Figure 4.3-1). It is much more likely that migration to and from the Nisga'a villages will, as it has in the past, experience peaks and valleys in response to different stages of mine development, to the effects of other projects expected to take place in the region, and in response to broader socio-economic drivers. Based on experience from the mining industry in general, it is less likely that people will move to the Nass Area during the construction phase of the mine because the employment prospects are of shorter duration and because construction is likely to be mainly undertaken by mobile contractors specialized in heavy engineering construction that are less likely to have a strong commitment to the Nisga'a communities. As is common with contemporary mining practice, the workforce would be housed in on-site accommodations and bussed between Terrace, Smithers, or other local centres and the camp at the beginning and end of each work rotation, precluding the need for people to move to the Nisga'a villages simply because they are closer to the mine site.

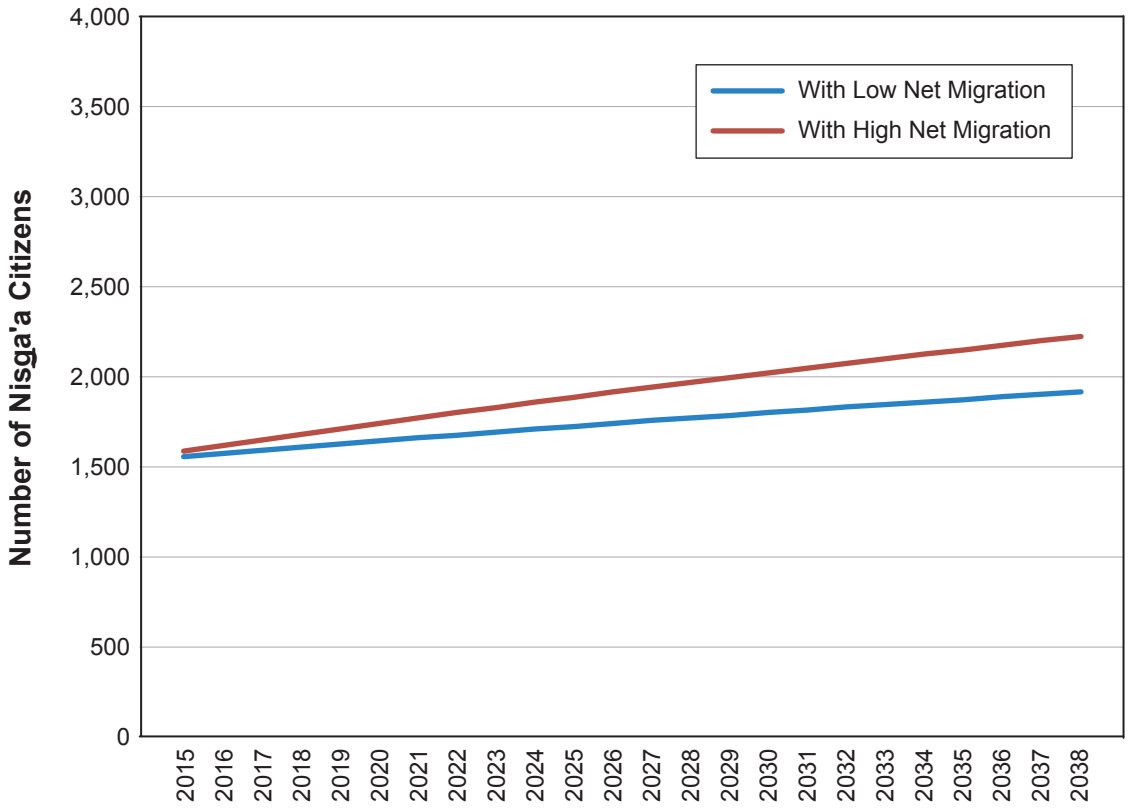
According to the SERC Survey, the difference in the level of interest among Nisga'a citizens in construction phase employment versus operation phase employment is not statistically significant. Furthermore, anecdotal evidence suggests that individuals may not make a strong distinction between the construction and operation phases. As noted earlier, people induced to migrate to (or back to) Nisga'a communities on the basis of being able to secure mine employment may view the construction phase as a starting point that may lead to future employment opportunities during operation. For these reasons, the distinction between construction and operation in the context of mine-related in-migration may, from the Nisga'a point of view, be secondary (or even tertiary) to other migration decision factors.

The level of migration anticipated during the construction phase would likely peak in the early stages, as hiring commences, rather than show a linear increase. Similarly, during the operation phase migration would likely be at its highest during the early years of operation, building towards a peak likely within the first 5 to 10 years. At some point, the rate of migration will level off and likely decline, once the mine is fully operational. Unless the mine continually expands its labour force and/or its demand for goods and services, it is unlikely the mine will induce ongoing migration in the linear fashion projected in the models. It is also possible that some people may start (or resume) a mining career but then choose to change jobs or pursue new opportunities that arise due to their improved credentials and experience. Such movement will cause further fluctuations in migration to and from the Nass Area.

As the Project reaches the end of its life predictions of the potential exodus of people from the Nass Area are especially uncertain. Considered in isolation it is reasonable to assume that there will be a loss of employment opportunity for people living in the Nisga'a communities as the Project winds down. Some Nisga'a citizens will likely leave if they perceive there to better, or simply more, opportunity in nearby centres such as Terrace, Prince Rupert, or Smithers. On the other hand, it may be just as likely that as the Project begins to wind down, Nisga'a citizens who have worked at the mine will find jobs with other natural resource development projects. A third possibility is that other, economically sustainable development pathways will have emerged, for example, from investment in infrastructure (e.g., the NTL) or the liquefied natural gas (LNG) sector.

Figure 4.3-1

Migration Scenarios: Total Population (+15) in Nisga'a Villages, 2015 to 2038



4.3.1 The Push of Perceived Mine-related Risks

The migration of Nisga'a citizens in response to mine related activity is not only a matter of being drawn to northwest BC or the Nass Area for work or business. The SERC Survey also explored respondent's intentions, including the reasons behind such intentions, to leave the Nass Area within the next five years (i.e., by approximately the year 2016). Respondents were then asked to consider how likely they would be to leave if the proposed mine projects were to proceed. Similar to the reasons given for moving to (or back to) the Nass, Nisga'a village residents provided a range of reasons that might cause them to leave including, for example, the pursuit of post-secondary education or to seek out other/better work opportunities.

About 30% (68 of 220) of respondents reported that they would be more likely to move away if the mine proceeds. Most of these "leavers" indicate that the prospect of a mine exerts moderate level of influence on their intention to move away.[5]

Some respondents, however, do appear to have a strong negative reaction to the prospect of a mine as suggested by the number of people (17 out of 114) who changed their ranking from "1" (no intention to move in the next five years) to a "7" (very likely to move) if a mine is to proceed. Respondents who reported a high likelihood to move if a mine proceeds were asked to give reasons as to why. There was a clear indication that some respondents were more likely to move away if a mine were to be developed because of concerns about pollution and/or environmental hazards related to mining activity. Commentary from the Nisga'a focus group interviews suggest that much of the concern about mining related environmental and health risks is linked to past experience, in particular with the old Kitsault Mine that closed in 1982 after only three years of operation (see Section 7.2.1). Therefore, history and relative proximity means that the Kitsault Project is likely a stronger influence than the Brucejack Project for those concerned about pollution and other environmental impacts. Therefore, because of the distance of the Brucejack Project from the Nisga'a villages, environmental concerns will likely have less of an influence on individual decisions to move from the communities.

4.3.2 Temporary versus Permanent Migration

The ESCIA Guidelines call for an estimation of the "migration and population effects that are expected to be of a temporary versus permanent nature." The labour needs of the construction phase of large projects are often regarded as temporary or short-term; thus, it might be expected that temporary migration effects would be most associated with this early period of mine development. Construction is also typically sub-contracted to third parties who often have less of a direct commitment to or affiliation with communities in and around the project region. Nevertheless, there may be some Nisga'a who have a reason or desire to move to (or back to) the Nass Area for whom mine construction employment would be an opportunity to "get a foot in the door" and, thereby, increase their opportunity for longer-term employment during the operation phase. In the context of

[5] For example, on a scale where 1 implies no intention to move and 7 implies "very likely to move", if a respondent ranked themselves as a 2 in the event of no mine, then they might rank their likelihood to move as 3 or 4 in the case of the mine proceeding.

broader, regional migration to northwest BC, temporary construction phase work might have less of an effect on people's decisions on whether or not to move (or move back to) the Nass Area.

The operation phase of the Project would provide a more permanent type of employment and, as such, might be expected to have a greater influence on migration in the region and especially migration to (back to) the Nass. The location of the Project relative to the Nisga'a communities may be a factor influencing decisions around more permanent migration, although the contemporary practice of fly-in/fly-out shiftwork at mine camps downplays the geographical advantage that proximity of a project might play in influencing people's decisions.

In the end, the occurrence of short-term versus long-term migration will depend on numerous social, cultural and economic variables and interactions that are likely to far outweigh the influence of a single project.

5. ECONOMIC IMPACT ASSESSMENT

5.1 ASSESSING ECONOMIC IMPACTS

In accordance with the ESCIA Guidelines and the results of effects assessment scoping (Section 3.4), the assessment of economic impacts focuses on the following VCs:

- Nisga'a employment;
- Nisga'a income;
- Nisga'a business revenue;
- Nisga'a business capacity and investment;
- Nisga'a natural resource related earnings and values; and
- NLG revenues and expenses.

Low, medium, and high regional development scenarios, for both with and without the Project (Section 2.2.4), provide the basis for estimating potential employment and business activities and inform the effects assessment. The main drivers are the economic effects associated with direct expenditures and employment that will be generated by the various projects. These direct project effects are assumed to drive employment, business activity, and migration.

The methodology acknowledges that the Brucejack Gold Mine Project will not happen in isolation and anticipates that other, unrelated initiatives may take place in the region that will affect certain variables of interest such as employment, migration, and business opportunities. For example, other projects, if they materialize, may compete for local workers and thereby increase the labour demand in the region.

The economic assessment relies on data provided in the Brucejack social, economic, land use baseline studies, quantitative and qualitative data collected through the Nisga'a SERC Survey (Rescan 2012a) and the Nisga'a Business Survey (Rescan 2012a), available secondary data from Statistics Canada and BC Stats, and design information available from prefeasibility studies and environmental assessments for other projects in the region. Economic impact modeling was also undertaken to evaluate the regional distribution of employment and business benefits related to the Project within BC. The results of this modeling are reported in the Brucejack Gold Mine Project Application/EIS (see Section 1.9, Project Benefits).[6]

[6] The British Columbia Input-Output Model (BCIOM, prepared by BC Stats) was used to assess the economic impacts of the construction and operation of the Brucejack Gold Mine Project. The model highlights the relationship among producers and consumers of goods and services and identifies the extent to which British Columbia economy would be affected by the Project expenditures. Additional modeling to estimate local impacts and national impacts (based on National Input-Output multipliers available from Stats Canada) was prepared by ERM Rescan.

5.2 NISGA'A EMPLOYMENT

In order to evaluate the employment impact of the projects, it is necessary to analyze the potential demand for workers, as well as the ability and availability of Nisga'a citizens to meet that potential demand.[7]

The analysis of Nisga'a employment focuses on net benefits from direct mine-related employment. In addition to the direct employment benefits, there are expected to be indirect and induced effects associated with the projects. Indirect effects are attributed to those businesses supplying the projects, while induced effects are due to direct and indirect employees spending their incomes on goods and services (e.g., resulting in retail and service business employment). The ESCIA Guidelines do not specifically call for analysis or projections of indirect and/or induced employment effects and related economic activity. In fact, it is not possible to accurately model such effects at the scale of the Nisga'a Nation.[8] Reliable estimates of total direct mine related employment effects of the Project at the provincial level are available and provided below to give broader context where appropriate.

5.2.1 Total Labour Demand of Projects

The estimation of labour demand projections considers the locations of the various projects, the terms of any IBA that exist between a project and specific Aboriginal communities (and for which information was publically available), project employment estimates as reported in pre-feasibility and environmental assessment documents, and information from input-output models with respect to projected regional and provincial employment effects.

To estimate the total labour demand from projects, three scenarios with various degrees of development are considered (see Section 2.2.4). Scenario 1 assumes the development of four projects: NTL, Forrest Kerr, McLymont Creek and Red Chris. These projects are estimated to demand a total of approximately 793 person-years of work during 2014 (this corresponds to the third year of construction of the NTL, Forrest Kerr, and McLymont Creek projects; and the last year of construction of Red Chris).[9] The year 2016 will be the first year of operation for NTL and Forrest Kerr, second year of operation for Red Chris, and the last year of construction for McLymont Creek. During operations, all projects with the exception of Red Chris are anticipated to demand a limited number of workers from the region since ongoing annual maintenance is expected to be carried out using a small number of existing staff and/or external contractors (Figure 5.2-1).[10]

---

[7] For Scenario 1 the projects refer to the NTL, Forrest Kerr, McLymont Creek and Red Chris. For Scenario 2 the projects refer to the NTL, Forrest Kerr, McLymont Creek, Red Chris, Kitsault, and KSM. For Scenario 3 the projects refer to the NTL, Forrest Kerr, McLymont Creek, Red Chris, Kitsault, KSM, Galore and Shaft Creek. Each scenario considers the case with and without the Brucejack Gold Mine Project.

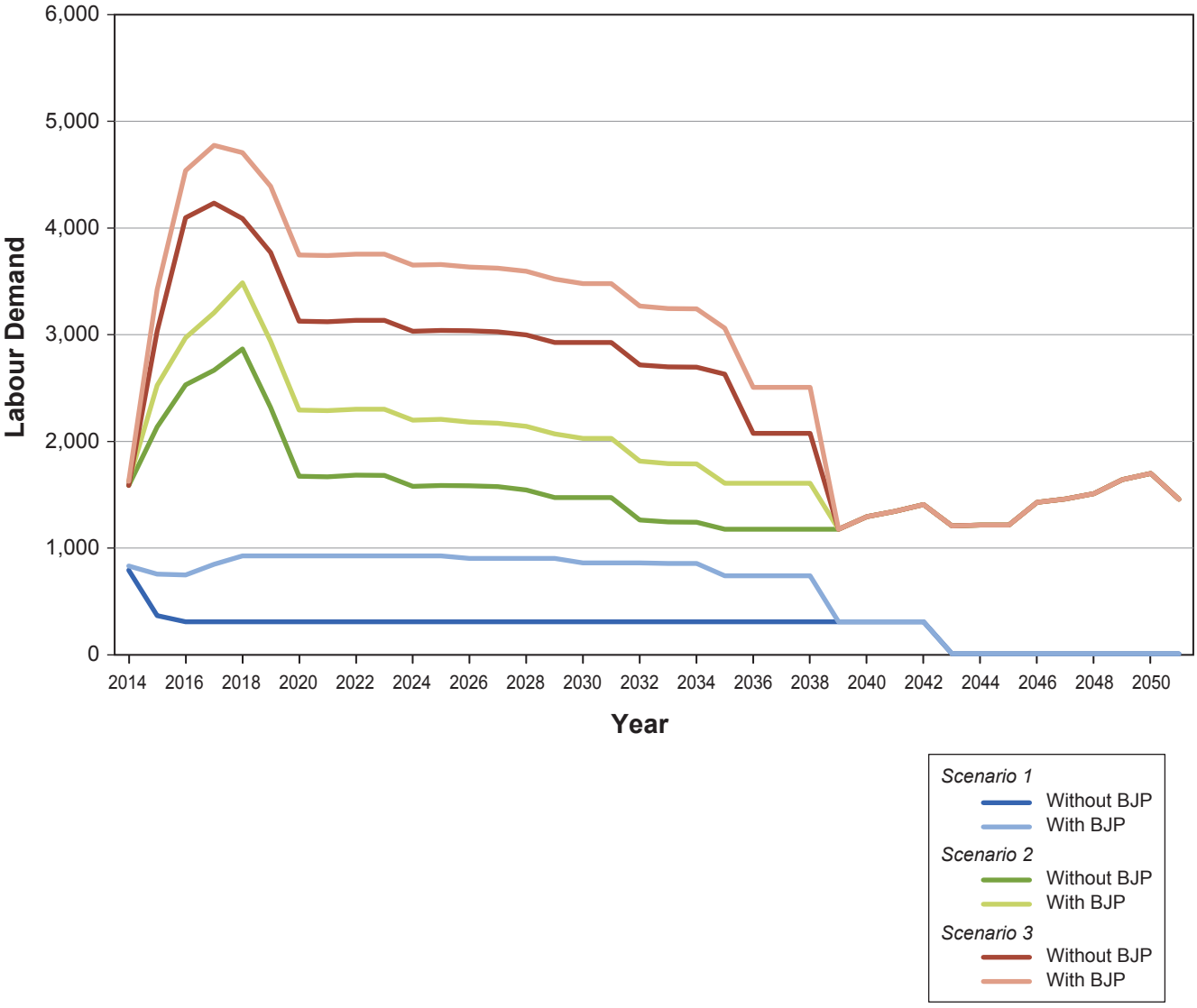
[8] Modeling indirect and induced effects would involve complex economic impact modeling that is beyond the scope of this study for a variety of reasons. Modeling on small populations is inherently unreliable due to the unpredictable effect of individual decisions and behaviour. There is a lack of sufficiently detailed design information for each project necessary to evaluate the indirect and induced effects of all the projects defined in the development scenarios. Further, the sum of the impacts of all the potential projects on the local area likely violates the analysis assumption requirements for the more straightforward input-output modeling.

[9] A person-year is a standardized unit of employment, representing one person working full-time (40 hours/week) for one full year, for a total of 2,080 hours worked; the term is used interchangeably with the reference to number of jobs as, for example, 393 person-years of employment in 2014 imply 393 full-times jobs in that year.

[10] All three scenarios are presented in a single figure for ease of comparison.

Figure 5.2-1

Scenarios of Total Potential Labour Demand from Projects



The total annual jobs demanded are predicted to decrease to approximately 308 person-years in 2016 and remain at approximately that number until 2039; this demand will be mostly driven by the Red Chris Project.

The construction of the Brucejack Gold Mine Project is expected to create a total of 40 full-time jobs in 2014, 390 jobs in 2015, the predicted first full year of the Project construction, and 440 jobs in 2016, the second year of construction.[11] The total labour demanded from all Projects under Scenario 1 is expected to be 833 person-years in 2014, 757 person-years in 2015 and 748 person-years in 2016. In the year 2017 when Brucejack Gold Mine Project operation is expected to begin, the Project will require an estimated 540 person-years of employment; this will increase to 619 jobs in the following year and remain fairly stable over the operation of the mine, decreasing to 431 jobs in 2038, the 22nd year of operation. The total labour demanded from all projects is expected to be 848 in 2017; it will peak at 927 person-years of employment between 2018 and 2025, and decrease to approximately 740 jobs in 2038. Projects are estimated to demand lesser amounts of labour from the years 2039 to 2051 (driven by NTL, Forrest Kerr, and McLymont Creek projects), remaining between approximately 9 jobs per year (Figure 5.2-1). Under Scenario 1, the Brucejack Gold Mine Project represents approximately 51% of the total labour demand in the year 2015, 59% in 2016, and 63 to 66% thereafter (years 2017 to 2038).

Under Scenario 2, both the Kitsault and the KSM projects are assumed to be developed in addition to NTL, Forrest Kerr, McLymont Creek and Red Chris projects; this scenario is also considered with and without the Brucejack Gold Mine Project. The construction of Kitsault is to begin in 2014, and it is projected to take approximately two years; the construction of KSM is also expected to start in 2014 and end in 2019. Without the Brucejack Gold Mine Project, labour demand is estimated to total approximately 1,587 person-years during 2014 and 2,135 during 2015. Following, the total demand for labour will steadily increase reaching a peak of 2,868 in 2018 and then gradually decrease to 1,176 person-years of employment in 2038; afterwards the total labour demanded will increase back to 1,457 as a result of KSM Project operation (Figure 5.2-1).

With the Project, the total number of jobs (person-years) during 2015 and 2016 are predicted to be approximately 2,525 and 2,971, respectively. Under Scenario 2, this is expected to increase over time to approximately 3,487 person-years during 2018, which is predicted to be the year of peak labour demand. Total labour demand is predicted to decrease to 1,607 in the last year of operation of the Brucejack Gold Mine Project. As with Scenario 1, total labour demand then increases for the rest of the study period, mainly associated with underground mining at KSM (Figure 5.2-1). Under Scenario 2, the Brucejack Gold Mine Project represents approximately 15% of the total labour demand in the year 2015, 15% in 2016; afterwards, the share increases from 17% in 2017 to 27% in 2038. From the year 2038 until 2051, the share of the demand due to KSM represents approximately 100% of the total labour demand.

Scenario 3 considers the highest level of regional development. In addition to Scenario 2 projects, Galore Creek, and Shaft Creek projects are assumed to be developed. Labour demand is estimated to

[11] These jobs represent those directly related to the construction of the Project in the Province of British Columbia. Year 2016 includes jobs related to the construction of the Project (Q1) and jobs resulting from the operation of the mine (Q2, Q3 and Q4).

total approximately 1,587 person-years during 2014 and 3,035 during 2015 (year 2015 is expected to be the first year of construction Galore Creek; the construction of Shaft Creek is expected to start in 2016 with 667 person-years of employment). Without the Brucejack Gold Mine Project, labour demand is then estimated to total approximately 4,098 person-years during 2016, increasing to approximately 4,234 person-years in 2017, the estimated peak of labour demand from the projects. Total labour demand is predicted to fall to approximately 2,078 in 2038, thereafter further falling to 1,457 person-years of employment by 2051 (Figure 5.2-1).

With the Brucejack Gold Mine Project under the high regional development scenario, there is expected to be an increase in total labour demand from approximately 3,425 person-years in the year 2015 to 4,538 in 2016. The total labour demanded is expected to peak at approximately 4,774 person-years in the year 2017 and then decrease to 2,507 by 2038. Labour demand is then predicted to decrease moderately before subsequently increasing by year 2051 (Figure 5.2-1). Under Scenario 3, the Brucejack Gold Mine Project represents approximately 11% of the total labour demand in the year 2015, 10% in 2016, and from a low of 11% in 2017 to a high of 18% in 2038; thereafter the KSM Project will constitute the vast majority of the labour demand for the remainder of the study period.

5.2.2 Potential Nisga'a Labour Supply

The potential employable labour supply was defined as Nisga'a citizens who:

- are 15 years of age or older, employed (part-time or full-time) or unemployed and looking for a job;[12]
- have expressed an interested in working at the mine or are willing to work under mine conditions;[13] and
- have the minimum required skills to work at the mine (defined as high school education or higher).

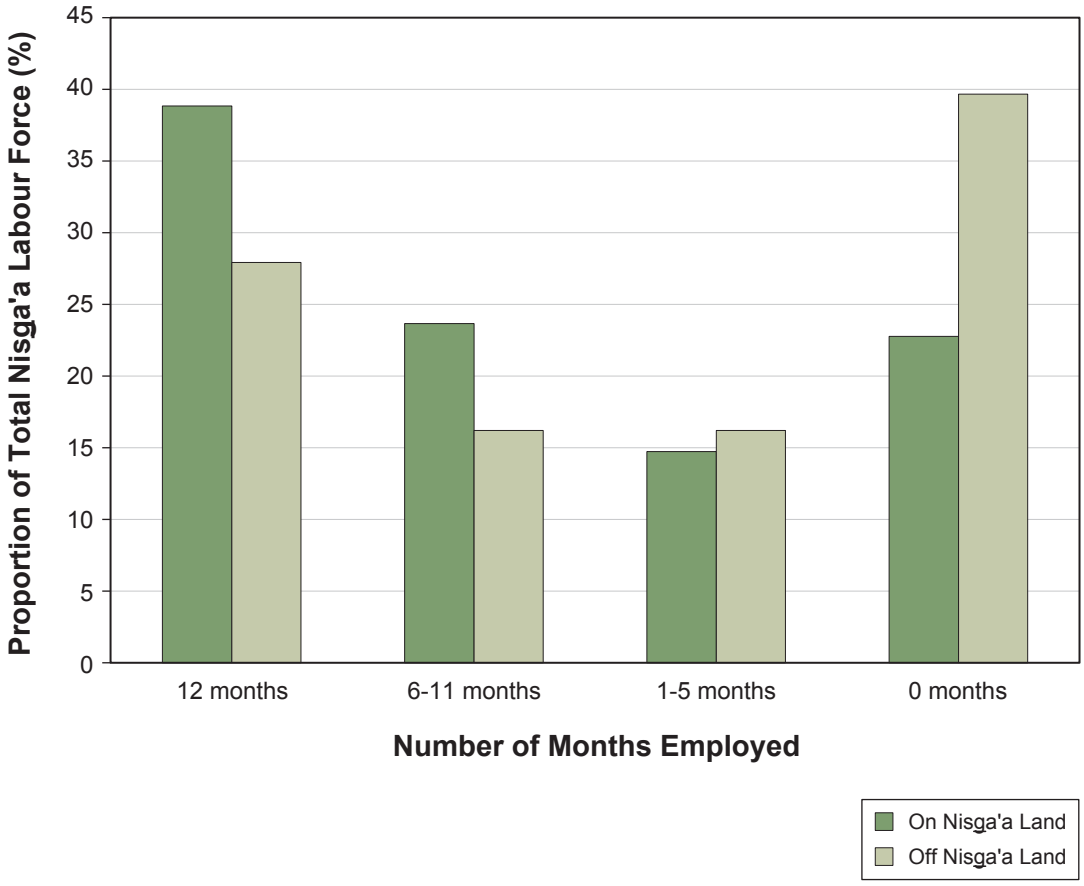
The largest proportion of the Nisga'a labour force is unemployed or employed part-time, a combined total of approximately 62% (Figure 5.2-2). Part-time workers represent around 40% of the labour force with almost half of them having worked less than five months during 2010.

[12] Employment status is derived from the SERC Survey using information on responses to questions on the total number of months worked and number of months worked in full-time, part-time, and seasonal jobs. The difference in the distribution of employment status between full-time employment, part-time employment, and unemployment among Nisga'a citizens residing in the Nisga'a villages and those residing off Nisga'a Lands is statistically significant; therefore, labour force in these two groups was separately estimated. The employment categories were defined as follows: 1) full-time: worked 12 months in a full-time (30 hours per week or more) job in 2010; 2) part-time: at least 1 month of work, less than 12 months in full-time employment, and any number of months in part-time or seasonal work; 3) unemployed: not retired and 0 months of work in 2010; and 4) retired: 0 months of employment during 2010 and self-response to main job status is "retired." The unemployed category from the survey includes respondents who were looking for jobs, were on temporal disability, were not looking for employment due to family obligations, were attending school, were not looking for work, and other reasons.

[13] The respondents who were not part of the potential labour force were ruled out by using the SERC Survey question "participant's interest in working at the mines." With this question respondents self-selected as not being part of the potential labour force (i.e., respondents who were not interested in mine work, including people on disability, attending school, not looking for employment, and with family obligations). Other important reasons provided by respondents for not being interested in mine work included satisfaction with current employment, type of work involved, working away from home in camp, and opposition to a mining project.

Figure 5.2-2

Distribution of Nisga'a Labour Force by Number of Months Employed, 2010



For the purposes of this analysis, it is assumed that the baseline of the potential Nisga'a employable labour force remains constant over time, adjusted only for natural population growth (i.e., annual births minus deaths) estimated at 0.5% per annum.[14]

Table 5.2-1 shows the estimated potential Nisga'a employable labour force. In 2011, the potential Nisga'a labour supply was approximately 1,140 individuals, consisting of 370 living on Nisga'a Lands and 775 living off Nisga'a Lands outside the Nass Area; the estimated 2014 potential Nisga'a labour supply is approximately 1,240.[15] With growth in the population, this is predicted to increase each year to a total of approximately 1,480 (540 on Nisga'a lands and 940 off Nisga'a lands) by the year 2051.

Table 5.2-1. Total Potential Nisga'a Labour Supply

Year	Potential Employable Labour Force		
	On Nisga'a Lands	Off Nisga'a Lands	Total
2014	400	840	1,240
2018	420	845	1,265
2022	435	850	1,285
2027	455	860	1,315
2032	475	875	1,350
2037	495	890	1,385
2042	510	905	1,415
2047	530	925	1,450
2051	540	940	1,480

Note:
Figures rounded to the nearest five. Sum may not add due to rounding error.

5.2.3 Nisga'a Skills and Experience

The actual number of persons who will be employed at the Brucejack Gold Mine Project and other projects in the region is expected to depend on the level of skills among Nisga'a citizens and the individuals' willingness and availability to work at the mines. The levels of qualifications required for these occupations are likely to differ according to education, training, skills, and experience (e.g., mining construction and operations will require general labourers, heavy equipment operators, technicians, scientists and engineers, supervisors, and managers, among others). The vast majority of jobs are expected to require at least secondary education. Enhancement of the existing training and skill sets, in particular post-secondary education and certification, will be required to maximize

[14] According to Statistics Canada, the natural population growth rate in Canada is approximately 0.3% per annum. The Aboriginal population in Canada has been increasing at approximately double that rate in recent decades; however, some of the increase is attributed to an increase in the number of people self-identifying as having at least some Aboriginal ancestry, hence the assumption of 0.5% for the Nisga'a annual natural population growth rate.
[15] Total labour force (population of age 15+) was approximately 30,150 for the Regional Districts of Kitimat-Stikine and 31,085 in Bulkley-Nechako (Town of Smithers had 4,290 person at the age of 15+), in the 2011 Census.

Nisga'a employment; however, research indicates that the Nisga'a labour force currently has relevant vocational and technical skills .

The results of the SERC Survey (Rescan 2012a) provide a profile of the current education and skill levels of Nisga'a citizens. Nearly three-quarters of respondents had at least a high school diploma or equivalency certificate, while about 40% had a college diploma or higher. Two-thirds of respondents reported general labour skills, and one-half reported vocational skills; one quarter reported technical or professional skills, and one-quarter reported management skills. Over one-quarter of all responses (i.e., all reported skills) are of technical, professional, or management skills (Rescan 2012a).

Within the focus groups session held with Nisga'a citizens, training was consistently discussed as being integral to maximizing employment opportunities for Nisga'a. The accessibility of training programs was an important consideration, with many people preferring training to be held in the Nisga'a villages. Training was thought of as generally positive, both in terms of preparing the Nisga'a communities for mine employment and diversifying the skill set of Nisga'a people (Rescan 2012a).

The most reported technical skill is carpentry; however, there was also a wide range of other skills reported, including millwright skills (Table 5.2-2).

Table 5.2-2. Technical Skills Reported in SERC Survey

Skill	Count	Percent of Responses	Percent of Cases	No. Apprentices	No. Journey Persons
1 – Millwright	5	4.9	7.2	3	2
2 – Mechanic	15	14.6	21.7	9	6
3 – Electrician	8	7.8	11.6	7	1
4 – Welder	13	12.6	18.8	9	3*
5 – Pipefitter	7	6.8	10.1	4	3
6 – Carpenter	38	36.9	55.1	24	12**
95 – Other	17	16.5	24.6	--	--
Total	**103**	**100.0**	**n/a**	**56**	**27**

Notes:
Percent of cases is based on 69 valid cases (0 missing cases) taking into account multiple responses.
Total percent of cases is n/a because it exceeds 100% due to multiple responses.
** one no response; ** two no response.*

The three most reported vocational skills were: camp, catering, and cook; first aid and safety; and secretarial, bookkeeping, accounting, and clerical (Table 5.2-3).

Additionally, as revealed by the SERC Survey (Rescan 2012a), approximately 6% of Nisga'a respondents indicated they work or have worked in the mining industry. Of those, approximately 30% have less than five years of experience, and none of the respondents have held a management position.

Table 5.2-3. Vocational Skills Reported in the SERC Survey

Skill	Count	Percent of Responses	Percent of Cases
1 - Heavy equipment operator	40	9.0	19.4
2 - Miner or logger	19	4.3	9.2
3 - Truck driver	32	7.2	15.5
4 - Bus driver	8	1.8	3.9
5 - Secretarial/bookkeeping/accounting/clerical	83	18.7	40.3
6 – Construction	43	9.7	20.9
7 - Camp/catering/cook	85	19.1	41.3
8 – Security	21	4.7	10.2
9 - First aid/safety	84	18.9	40.8
10 - Health care	5	1.1	2.4
11 – Education	9	2.0	4.4
95 – Other	16	3.6	7.8
Total	**445**	**100.0**	**n/a**

Notes:
Percent of cases is based on 206 valid cases (0 missing cases).
Total percent of cases is n/a because it exceeds 100% due to multiple responses.

The success of the projects employing Nisga'a is dependent on both the individual and corporate commitment to training and education. Typically younger and with limited industry experience, the Aboriginal labour force will require training to optimize participation in the mining industry. This training will be required for a number of occupations; the top five BC mining industry occupations with the largest projected shortages are mechanic, electrician, welder, millwright, and machinist, in that order (MIHR 2008). Aboriginal training programs for the mining sector have been found to typically be most effective when undertaken in collaboration and partnership with Aboriginal communities and provincial and federal governments, and usually require long-term planning for successful implementation (MITAC 2005).

5.2.4 Nisga'a Employment Effects

The potential Nisga'a labour supply estimate described in Section 5.2.2 indicates the maximum number of Nisga'a potentially available for employment by the projects. However, the actual number employed is expected to be less than this amount. This is because we are not able to statistically account for barriers to employment, competing employment opportunities, or the decisions of individuals as to their choice of employment. Barriers may include, most notably, availability/suitability of skills training and upgrading, among others.

In other words, the potential Nisga'a labour force is essentially a measure of all those in the labour force that have a minimum level of education and are believed to be interested in mine-related work – only a proportion of Nisga'a labour force as shown by Table 5.2-1 is expected to be actually employed by the projects.

Section 5.2.1 details the total direct labour demand or need for workers by the various projects. A proportion of this total employment will be Nisga'a employment. The expected total level of Nisga'a employment by the projects was calculated based on available project design information, documented experience of other projects, and the predictions of other project proponents on their expected levels of regional, Aboriginal and Nisga'a employment. In short, the total demand for Nisga'a workers by the projects was estimated as the sum of the individual estimates of the number of Nisga'a expected to be employed by each project. A detailed evaluation of the Nisga'a employment estimates for each project was not conducted and is outside of the scope of this study; specifically, labour force requirements for each project were not evaluated against the skills and experience profile of the Nisga'a labour force. This was not possible because of the level of design detail available for each project, and is appropriate given the project uncertainties.

Figure 5.2-3 shows the model projections of the estimated Nisga'a employment under the three scenarios.[16] The total cumulative effect is shown by the number of Nisga'a jobs expected for all projects, including the Brucejack Gold Mine Project, under each scenario. The incremental effect of the Brucejack Gold Mine Project is the difference between the upper line and the lower line for each scenario, which represents total Nisga'a jobs excluding the Brucejack Gold Mine Project.

In Tables 5.2-4, 5.2-5, and 5.2-6, data are shown for 2014 through 2038 which provide a year by year comparison of incremental (estimated jobs from the Brucejack Gold Mine Project) and cumulative employment effects for each scenario. The estimates indicate that the Brucejack Gold Mine Project is expected to hire approximately five Nisga'a workers during construction and approximately 36 during operation of the mine. Under Scenario 1, the total cumulative number of jobs for Nisga'a is estimated at approximately 30 to 61 jobs. Under Scenario 2, the total cumulative number of jobs for Nisga'a is estimated at approximately 107 to 242 jobs. Under Scenario 3, the total cumulative number of jobs is 160 to 416.

It is again important to note, however, that the resulting estimates for the total Nisga'a employment are the total number of jobs that can reasonably be expected to be filled by Nisga'a citizens under each scenario based on the expectations for each project. It is possible that actual employment is higher, as project-level estimates tend to be conservative. In fact, the total potential Nisga'a labour force estimates (Table 5.2-1) show that the number of Nisga'a workers interested in mine employment is greater than the total number expected to be employed (Figure 5.2-3).

The supply of well-qualified and experienced Nisga'a readily available and able to take up mine-related employment with all the projects is limited. Consequently, it is difficult to predict with certainty the actual number of jobs that would be available for Nisga'a citizens; this is determined by the level of mine-related skills. But skills training alone is often not sufficient for entry into the job market, as actual employment experience is also highly valued by employers.

[16] The drop in predicted employment presented in scenarios 2 and 3 is linked to the closure of the Kitsault Mine Project in 2029 and then the Brucejack Gold Mine Project in 2038.

Figure 5.2-3

Scenarios of Total Expected Jobs Filled by Nisga'a Citizens

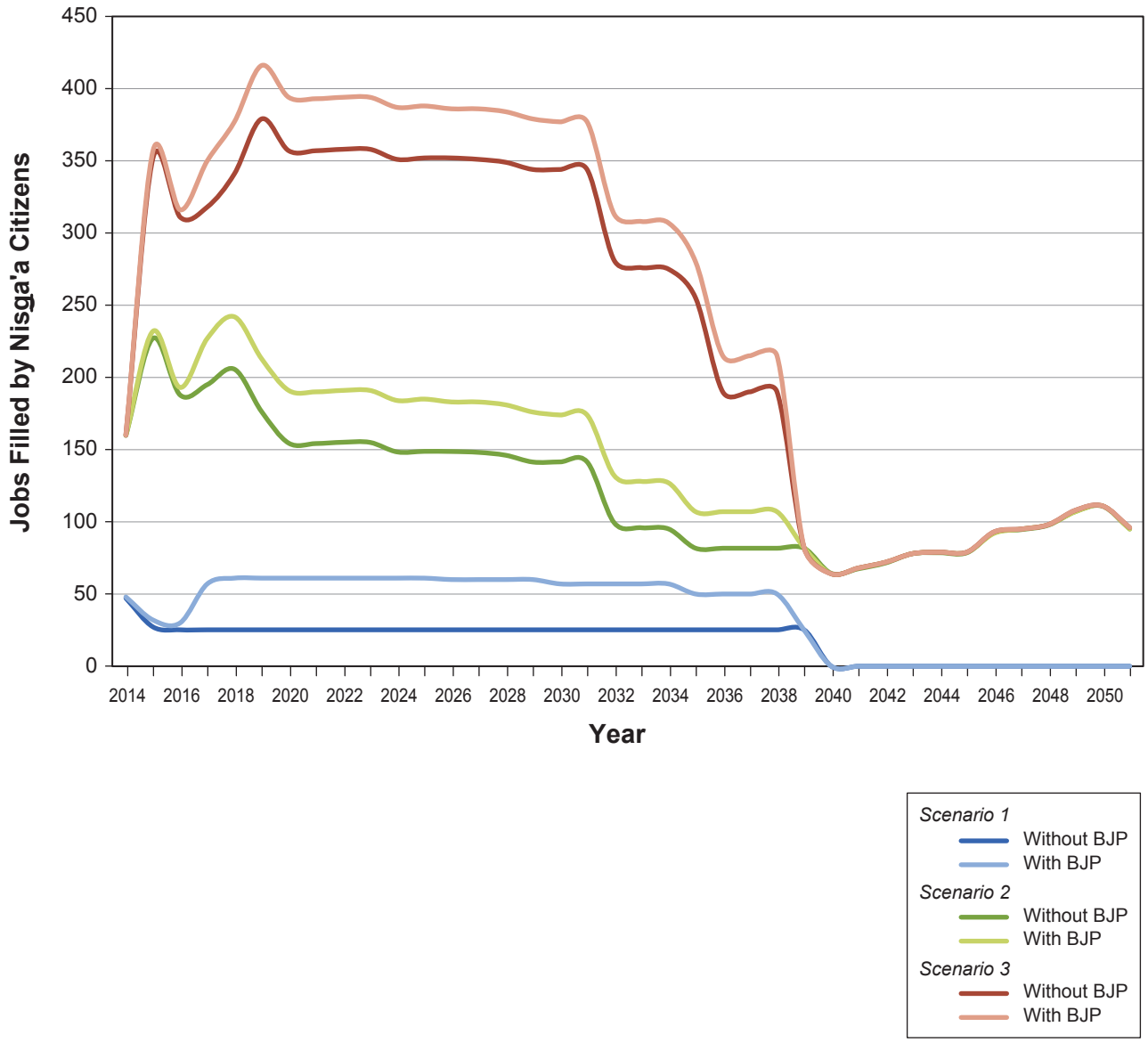


Table 5.2-4. Incremental and Cumulative Potential Number of Jobs for Nisga'a, 2014 to 2038 (Scenario 1)

Year	Number of Jobs for Nisga'a (Person-Years)		
	Without Brucejack	Brucejack Only (Incremental)	Total (Cumulative)
2014	47	0	48
2015	27	5	32
2016	25	5	30
2017	25	32	57
2018	25	36	61
2019	25	36	61
2020	25	36	61
2021	25	36	61
2022	25	36	61
2023	25	36	61
2024	25	36	61
2025	25	36	61
2026	25	35	60
2027	25	35	60
2028	25	35	60
2029	25	35	60
2030	25	32	57
2031	25	32	57
2032	25	32	57
2033	25	32	57
2034	25	32	57
2035	25	25	50
2036	25	25	50
2037	25	25	50
2038	25	25	50

Table 5.2-5. Incremental and Cumulative Potential Number of Jobs for Nisga'a, 2014 to 2038 (Scenario 2)

Year	Number of Jobs for Nisga'a (Person-Years)		
	Without Brucejack	Brucejack Only (Incremental)	Total (Cumulative)
2014	160	0	160
2015	227	5	232
2016	188	5	193
2017	195	32	227
2018	206	36	242

(continued)

Table 5.2-5. Incremental and Cumulative Potential Number of Jobs for Nisga'a, 2014 to 2038 (Scenario 2) (completed)

Year	Number of Jobs for Nisga'a (Person-Years)		
	Without Brucejack	Brucejack Only (Incremental)	Total (Cumulative)
2019	176	36	213
2020	154	36	191
2021	154	36	190
2022	155	36	191
2023	155	36	191
2024	148	36	184
2025	149	36	185
2026	149	35	183
2027	148	35	183
2028	146	35	181
2029	141	35	176
2030	141	32	174
2031	141	32	174
2032	99	32	132
2033	96	32	128
2034	95	32	127
2035	82	25	107
2036	82	25	107
2037	82	25	107
2038	82	25	107

Table 5.2-6. Incremental and Cumulative Potential Number of Jobs for Nisga'a, 2014 to 2038 (Scenario 3)

Year	Number of Jobs for Nisga'a (Person-Years)		
	Without Brucejack	Brucejack Only (Incremental)	Total (Cumulative)
2014	160	0	160
2015	352	5	357
2016	311	5	316
2017	318	32	350
2018	341	36	377
2019	379	36	416
2020	357	36	394
2021	357	36	393
2022	358	36	394
2023	358	36	394

(continued)

Table 5.2-6. Incremental and Cumulative Potential Number of Jobs for Nisga'a, 2014 to 2038 (Scenario 3) (completed)

Year	Number of Jobs for Nisga'a (Person-Years)		
	Without Brucejack	Brucejack Only (Incremental)	Total (Cumulative)
2024	351	36	387
2025	352	36	388
2026	352	35	386
2027	351	35	386
2028	349	35	384
2029	344	35	379
2030	344	32	377
2031	344	32	377
2032	281	32	313
2033	276	32	308
2034	275	32	307
2035	255	25	280
2036	190	25	215
2037	190	25	215
2038	190	25	215

As well as skills-related barriers to employment, recent socio-economic research identified a secondary limitation to securing employment with projects, particularly during construction. Specifically, the businesses that obtain contracts to supply large scale development projects with employees often make use of unions and unionized employees, limiting jobs for non-union workers (Gitlaxt'aamiks Village Government, pers. comm. 2014).

In addition, the projects and existing Nisga'a businesses will likely need to compete for skilled and experienced workers. Highly-qualified Nisga'a are expected to continue to be in high demand, resulting in competition among potential employers with the likelihood that the Brucejack Gold Mine Project and other projects will attract some workers away from their current jobs. The perceived opportunities and challenges for Nisga'a businesses associated with the potential for increased competition for labour are discussed in more detail in Section 5.6.

5.2.4.1 Brucejack Gold Mine Project Employment Opportunities

The construction of the Brucejack Gold Mine Project is expected to take approximately two years, with the planned construction for 2015 and 2016. It has been estimated that, during that phase, the Project would provide 870 person-years of direct on-site employment. The results of economic impact modeling indicate that the total BC-based employment (including direct, indirect, and induced employment) created by the Project would total to 3,912 person-years during the construction period.

The Project is expected to remain in operation for approximately 22 years. The prediction is that, during that time, the mine will create approximately 12,353 person-years of direct on-site employment, an average of 561 full-time jobs a year. In addition, the BC input-output model predicts that the operation of the mine will create 16,603 person-years of employment in supplier industries, for a total of 28,956 person-years of BC-based employment (including direct, indirect, and induced employment opportunities).

Based on the discussion and explanations provided above in Section 5.2.1, it is predicted that approximately five Nisga'a could potentially work on the Project during the construction phase and approximately 36 during the operation phase (Tables 5.2-4, 5.2-5 and 5.2-6). As expected, the total cumulative employment impact (from all projects) is greatest under Scenario 3 (Table 5.2-6), which reaches a peak of approximately 416 full-time jobs in the year 2019. At that time, the total potential Nisga'a labour force will be approximately 420 living on Nisga'a lands and 845 living off Nisga'a lands (Table 5.2-1). As mentioned, the estimated number of jobs for Nisga'a represents the level of Nisga'a employment reasonably expected and not the maximum number of individuals all the projects could potentially hire. Additionally, as the demand for Nisga'a workers is determined by the expected or the desired project employment, this demand is also expected to be closely tied to the availability of skilled and experienced Nisga'a.

Although employment opportunities would be available to Nisga'a citizens, heavy engineering construction associated with mine projects typically requires a relatively large number of trained and skilled workers over a short period of time, who are predominantly brought in from outside the region (e.g., use of a mobile construction workforce, where workers move from one heavy engineering construction project to another). Because of the employment requirements, the share of those employed locally may be relatively modest with most construction work undertaken by contactors and businesses located outside the local region due to the specialised construction experience and expertise needed. However, it is expected that those contractors hired from outside the region would, in turn, hire local people as labourers and equipment operators to undertake non-skilled construction. The estimate of Nisga'a employment assumes that efforts are undertaken with respect to workforce engagement, training or other measures in order to increase employment results among local and regional populations.

Operation brings longer-term employment opportunities and affords a greater opportunity for training and skills development to increase the share of Nisga'a citizen employment. For the Brucejack Gold Mine Project, regional residents are expected to account for a larger operations workforce as compared to the construction stage. The remainder would be brought into the region in order to meet job requirements. Assuming appropriate engagement and training of the potential Nisga'a labour force, an estimated 36 Nisga'a citizens could be employed during operations of the Project. However, it is likely that larger projects, such as KSM, will attract a number of skilled workers, increasing the competition for skilled and experienced labour. This might impose additional constraints on the availability of Nisga'a labour and, therefore, the number of Nisga'a workers hired by the Brucejack Gold Mine Project.

Decommissioning and closure will provide fewer employment opportunities. Decommissioning and closure of the Brucejack Gold Mine Project is expected to occur over three years beginning in the 2039;

however, at this point it is uncertain how many positions would be created. Regional workers hired for decommissioning and closure would likely have been previously employed during mine operations. Given that decommissioning and closure is far into the future, it is difficult to predict the profile of those employed, but is it reasonable to expect that some would be Nisga'a.

5.2.4.2 Aboriginal Employment Achieved by NWT and Labrador Mines

The experience of BHP Billiton Ekati Diamond Mine (NWT), Rio Tinto/Harry Winston's Diavik Diamond Mine (NWT), and Vale's Voisey's Bay Nickel Project (Labrador) were examined to provide a comparative reference point for the evaluation of the Nisga'a employment opportunities. For these three operating mines, IBAs were signed between the mining companies and the Aboriginal communities in order to formally define long-term social and economic commitments, including mechanisms of priority hiring, employee training, and preferential business opportunities. The factors underlying employment results and publically available details of the relevant IBAs are assessed in the detailed discussion of these case studies reported elsewhere (Rescan 2012b, 2012a).

For the Ekati Diamond Mine, a target of 31% of the total workforce being northern Aboriginal was established for operations. In 2006, the reported level of Aboriginal hire was 34%, with 57% of these positions being skilled or professional categories. In 2008, 800 people were employed at the Ekati Diamond Mine, with approximately 600 additional contractors providing support services. Of this total, approximately 33% were reported to be Aboriginal.

For the Voisey's Bay Nickel Project, Innu employment varied from 7.5% of the workforce in 2003, to 6.4% in 2004, 5.8% in 2005, and 6.4% in 2006 (years for which data are available). Similarly, Inuit employment varied from 16.2% in 2003, to 11.7% in 2004, 12.6% in 2005, and 17.0% in 2006. Correspondingly, non-Aboriginal employment varied from approximately 76 to 82% over that time period of operation. Vale notes that by the end of 2010, total Aboriginal employment reached 55% of the workforce at their Labrador operations, although across all parts of the Voisey's Bay Nickel Mine Innu and Inuit employment as a portion of the total workforce was much lower.

Diavik expected local community residents to initially fill at least 66% of its mining operations workforce and over time, employment of local residents would approach 100%. The operation's workforce was expected to average approximately 400 workers, with 40% being northern Aboriginal. The actual percentage of Aboriginal people employed at Diavik during its operation phase has been consistently below the expected target, from a high of approximately 36% in 2003 and 2004 to a low of 30% in 2010, although the total number of workers exceeded predictions (with operations requiring over 1,000 employees by 2011). The shortfall in the share of northern employment was, in part, attributed to their being a shortage of skilled underground labour in the North; as such, labour had to be recruited from the southern regions of the country to fill the need.

In sum, both the Ekati Diamond Mine and Diavik Diamond Mine in the NWT achieved Aboriginal employment of about one-third of their total operation workforce. The Voisey's Bay Nickel Project has achieved lower numbers, with an average of approximately 20% of the operations workforce being Aboriginal. By comparison, it is estimated in this report that 10% of direct construction workforce and 50% of direct operation workforce will be from the Project region. Further,

approximately 35% of the Project's direct regional operation workforce will be of Aboriginal identity, with a third of it being of Nisga'a identity. This estimate for the Brucejack Project takes into account the corresponding estimated demand for labour by the other projects discussed previously. Given the documented experience of other projects that have implemented effective Aboriginal employment strategies, the estimates of Nisga'a employment for the Brucejack Gold Mine Project are realistic and would appear not only achievable but also possible of exceeding the given predictions.

5.2.4.3 The Mining Sector Labour Shortage

BC's mining sector recently experienced a labour shortage. This shortage was due to a number of factors, including economic growth and changes in population demographics. Past growth was driven by high commodity prices, significant expenditures on exploration, and the development of energy infrastructure in remote locations. Despite the recent slowdown, the BC mining sector is poised for further growth. Decreasing birth rates and increasing population aging, however, are limiting the amount of labour available to support this growth. In an already shrinking labour force, mining sector-related skills are becoming increasingly scarce as the experienced labour force retires, adding additional human resource challenges (MIHR 2008; Pollen 2011; Statistics Canada 2011).[17]

It is likely that the Brucejack Gold Mine Project will face a competitive labour market in the future. In addition to competition with other mining developments in BC, such as the KSM or Kitsault projects, the Project will have to compete with large-scale developments in other provinces, such as the oil sands in Alberta or the potash and oil and gas industries in Saskatchewan (MIHR 2008, 2011). Although competition will be high, opportunities currently exist to increase attraction and retention of traditionally underrepresented groups, such as Aboriginal peoples. Aboriginal peoples are currently one of the youngest and fastest growing segments of the Canadian population (Statistics Canada 2007). In addition, many Aboriginal communities are relatively close to mine sites. If trained to fit the needs of the mining industry, the Aboriginal population could help fill expected labour market shortages (MIHR 2008, 2011; Pollen 2011).

5.3 NISGA'A INCOME

This section estimates the net employment income of jobs created by the Project and potentially filled by Nisga'a citizens under each of the three defined scenarios. As defined for the employment estimates detailed in Section 5.2, this is assumed to potentially include those currently unemployed and employed (full-time or part-time), with a minimum of high school level of education, and who expressed an interest in working at a mine as estimated by the SERC Survey (Rescan 2012a). The analysis considers the income gains relative to what would be expected in the absence of the projects, both in terms of the incremental and cumulative effects. This involves taking into account the income foregone by citizens (i.e., the opportunity cost of labour).

[17] As this report is being written there are increasing references to a slowdown in the global mining sector due to a variety of macro-economic factors. In general it is assumed here that the long term prospect of a labour shortage for mine labour is still valid.

The approach recognizes that a proportion of the potential workers hired would already be employed in other activities, either full- or part-time. In that case, the projects would only generate net benefits if they offer greater income earnings relative to any current position held elsewhere. For those counted as part of the potential employable labour force that are already employed, the opportunity cost reflects the current wages they receive and that they have to forego in order to work for the projects. For the potential workers who are currently unemployed or are not participating in the economy, the current earnings are assumed to be negligible (i.e., zero opportunity cost of labour).

Overall, construction of the Brucejack Gold Mine Project is expected to contribute $134.0 million in household income resulting from direct construction activities at the site. Additional $173.7 million is expected to benefit workers in BC-based supplier industries (income coming from direct, indirect and induced supplier activities). During the 22-year life of mine, the Project is expected to contribute $1,475.4 million in household income (including benefits),[18] with additional $856.1 million coming from direct, indirect and induced supplier activities.

As estimated for the Brucejack Gold Mine Project, the average direct annual employment earnings for wage employees in equipment operator and labourer job categories for the operation phase are approximately $66,600 (including benefits).[19] This annual salary is adopted as a conservative, lower estimate of income earned by Nisga'a employees on mine projects both because job categories requiring higher skill sets will have higher earnings, and there is typically overtime worked in these positions that will add to earnings.[20] Median employment income in the region for Aboriginal workers is estimated to be approximately $17,200 for all workers and $43,700 for those working full-time.[21]

Based on these estimates, the incremental and cumulative net increase in employment income was calculated. The results for 2014 to 2038 are shown in Tables 5.3-1., 5.3-2, and 5.3-3 for development Scenario 1, 2, and 3, respectively. The average net income (i.e., income earned with the Project minus average income earning if working elsewhere) for Nisga'a individuals that may be employed by the Project is estimated to be approximately $40,000 per year.[22]

---

[18] Wage/salary estimates include burden calculated at 30.4% of the base salary plus annual bonuses, statutory holidays, and vacations. The benefit burden consists of Registered Retirement Savings Plans (RRSPs), various life and accident insurances, extended medical benefits, BC Medical Service Plan (MSP), Canadian Pension Plan (CPP), Employment Insurance (EI), Workers' Compensation Board (WCB) insurance, tool allowance, and other benefits.

[19] Salary/wages are based on current labour rates in comparable operations in BC.

[20] For operation, other job categories earn substantially more, particularly in skilled or professional underground jobs. For construction of the Brucejack Gold Mine Project, the annual earnings of lower skilled job categories (i.e., helpers and skilled labourers) are expected to be higher than the average of $66,600 assumed here, mainly because of the amount of overtime that is typical for the work. For example, the base annual earnings of a helper, an entry-level position, is approximately $56,000 per year excluding any overtime or benefits, which can add an additional 25% or more to earnings.

[21] Estimated using Statistics Canada (2007) earnings data for all Aboriginal workers working full-time, full-year in 2005. The region is defined as including the District Municipality of Stewart, the Kitimat-Stikine Regional District Electoral Area B, the Town of Smithers, and Terrace Census Agglomeration. 2005 earnings are converted to 2012 current dollar estimates assuming an annual average nominal growth rate of 4%; this average annual rate of change is as experienced for median employment income within the region from 2005 to 2008 (BC Stats 2011).

[22] This estimate takes into account the opportunity cost of labour associated with those currently working either full-time or part-time and who have an interest in mining work.

Table 5.3-1. Incremental and Cumulative Net Income Effects for Nisga'a, 2014 to 2038 (Scenario 1)

	Net Income for Nisga'a (million 2012 dollars)		
Year	Other Projects	Brucejack Gold Mine Project (Incremental)	Total (Cumulative)
2014	$1.9	$0.0	$1.9
2015	$1.1	$0.2	$1.3
2016	$1.0	$0.2	$1.2
2017	$1.0	$1.3	$2.3
2018	$1.0	$1.4	$2.5
2019	$1.0	$1.4	$2.5
2020	$1.0	$1.4	$2.5
2021	$1.0	$1.4	$2.5
2022	$1.0	$1.4	$2.5
2023	$1.0	$1.4	$2.5
2024	$1.0	$1.4	$2.5
2025	$1.0	$1.4	$2.5
2026	$1.0	$1.4	$2.4
2027	$1.0	$1.4	$2.4
2028	$1.0	$1.4	$2.4
2029	$1.0	$1.4	$2.4
2030	$1.0	$1.3	$2.3
2031	$1.0	$1.3	$2.3
2032	$1.0	$1.3	$2.3
2033	$1.0	$1.3	$2.3
2034	$1.0	$1.3	$2.3
2035	$1.0	$1.0	$2.0
2036	$1.0	$1.0	$2.0
2037	$1.0	$1.0	$2.0
2038	$1.0	$1.0	$2.0

Table 5.3-2. Incremental and Cumulative Net Income Effects for Nisga'a, 2014 to 2038 (Scenario 2)

	Net Income for Nisga'a (million 2012 dollars)		
Year	Other Projects	Brucejack Gold Mine Project (Incremental)	Total (Cumulative)
2014	$6.4	$0.0	$6.4
2015	$9.1	$0.2	$9.3
2016	$7.5	$0.2	$7.7
2017	$7.8	$1.3	$9.1
2018	$8.2	$1.4	$9.7
2019	$7.1	$1.4	$8.5

(continued)

Table 5.3-2. Incremental and Cumulative Net Income Effects for Nisga'a, 2014 to 2038 (Scenario 2) (completed)

Year	Net Income for Nisga'a (million 2012 dollars)		
	Other Projects	Brucejack Gold Mine Project (Incremental)	Total (Cumulative)
2020	$6.2	$1.4	$7.6
2021	$6.2	$1.4	$7.6
2022	$6.2	$1.4	$7.7
2023	$6.2	$1.4	$7.6
2024	$5.9	$1.4	$7.4
2025	$6.0	$1.4	$7.4
2026	$6.0	$1.4	$7.3
2027	$5.9	$1.4	$7.3
2028	$5.8	$1.4	$7.2
2029	$5.7	$1.4	$7.1
2030	$5.7	$1.3	$7.0
2031	$5.7	$1.3	$7.0
2032	$4.0	$1.3	$5.3
2033	$3.8	$1.3	$5.1
2034	$3.8	$1.3	$5.1
2035	$3.3	$1.0	$4.3
2036	$3.3	$1.0	$4.3
2037	$3.3	$1.0	$4.3
2038	$3.3	$1.0	$4.3

Table 5.3-3. Incremental and Cumulative Net Income Effects for Nisga'a, 2014 to 2038 (Scenario 3)

Year	Net Income for Nisga'a (million 2012 dollars)		
	Other Projects	Brucejack Gold Mine Project (Incremental)	Total (Cumulative)
2014	$6.4	$0.0	$6.4
2015	$14.1	$0.2	$14.3
2016	$12.4	$0.2	$12.6
2017	$12.7	$1.3	$14.0
2018	$13.6	$1.4	$15.1
2019	$15.2	$1.4	$16.6
2020	$14.3	$1.4	$15.8
2021	$14.3	$1.4	$15.7
2022	$14.3	$1.4	$15.8
2023	$14.3	$1.4	$15.8

(continued)

Table 5.3-3. Incremental and Cumulative Net Income Effects for Nisga'a, 2014 to 2038 (Scenario 3) (completed)

Year	Net Income for Nisga'a (million 2012 dollars)		
	Other Projects	Brucejack Gold Mine Project (Incremental)	Total (Cumulative)
2024	$14.1	$1.4	$15.5
2025	$14.1	$1.4	$15.5
2026	$14.1	$1.4	$15.5
2027	$14.0	$1.4	$15.4
2028	$14.0	$1.4	$15.4
2029	$13.8	$1.4	$15.2
2030	$13.8	$1.3	$15.1
2031	$13.8	$1.3	$15.1
2032	$11.3	$1.3	$12.5
2033	$11.0	$1.3	$12.3
2034	$11.0	$1.3	$12.3
2035	$10.2	$1.0	$11.2
2036	$7.6	$1.0	$8.6
2037	$7.6	$1.0	$8.6
2038	$7.6	$1.0	$8.6

The total net income effect of the Brucejack Gold Mine Project is estimated at $29.2 million. Under Scenario 1, the total cumulative net income effect is estimated at $55.4 million; this effect is mainly a result of the Brucejack and Red Chris projects as NTL, Forrest Kerr and McLymont Creek are not expected to require substantial employment (Table 5.3-1). Under Scenario 2, the total cumulative net income effect is estimated at $171.4 million; this total largely represents the contribution of the KSM and Kitsault projects (Table 5.3-2). Under Scenario 3, the total cumulative net income effect is estimated at $338.9 million, the difference from Scenario 2 representing the addition of Galore Creek and Shaft Creek projects (Table 5.3-3).

5.4 NISGA'A BUSINESS CAPACITY AND INVESTMENT

5.4.1 Profile of Existing Nisga'a Businesses

Nisga'a Business Directory is to be developed by NLG to provide a contact listing for all legitimate Nisga'a businesses. Supplementary, the Nisga'a Business Survey provides information to profile existing businesses (Rescan 2012a). During survey collection, respondents reported that, on average, they were active in approximately four types or sectors of business operation. Overall a wide range of sectors were reported (Table 5.4-1). About 20% of businesses (four businesses) have worked in the mining, quarrying, and oil and gas sector. Six businesses (27.3%) have worked in the construction sector, five have worked in the forestry sector (22.7%), and another five (22.7%) have worked in the transport sector. Most respondents (14 or 63.6%) indicated that their business had worked in the tourism/accommodation/food services sector.

Table 5.4-1. Main Sectors Occupied by Nisga'a Businesses

Sector	Frequency	Percent of Responses	Percent of Cases
Tourism/accommodation/food services	14	17.7	63.6
Retail and wholesale sales	7	8.9	31.8
Other services (incl. gov't)	4	5.1	18.2
Information, culture, and recreation	7	8.9	31.8
Cultural industries	5	6.3	22.7
Health care and social assistance	3	3.8	13.6
Professional scientific	1	1.3	4.5
Manufacturing	2	2.5	9.1
Mining, quarrying, oil, gas	4	5.1	18.2
Educational services	3	3.8	13.6
Business, building, and other support services	7	8.9	31.8
Transportation	5	6.3	22.7
Utilities	1	1.3	4.5
Fishing	5	6.3	22.7
Forestry	5	6.3	22.7
Construction	6	7.6	27.3
Total	**79**	**100.0**	**n/a**

Notes: Percent of cases is based on 22 valid cases. Percent of responses may not sum to 100% because of rounding error. Total percent of cases is n/a because it exceeds 100% due to multiple responses.

More than one-third of businesses have provided infrastructure and maintenance services. About 27% have provided catering services, and another 27% have provided accommodation and food services (Table 5.4-2). Three businesses (13.6%) have provided construction and earth works services and two (9.1%) have provided transportation services. On average, each business reported having provided two services.

Table 5.4-2. Main Services and Goods Provided by Nisga'a Businesses

Service/Goods	Frequency	Percent of Responses	Percent of Cases
Catering	6	14.3	27.3
Accommodation/ food services	6	14.3	27.3
Retail	3	7.1	13.6
Transportation	2	4.8	9.1
Business Services	2	4.8	9.1
Social/educational services	1	2.4	4.5
Resource harvesting	4	9.5	18.2
Utilities	2	4.8	9.1
Tourism/recreation services	1	2.4	4.5
Garbage collection	2	4.8	9.1

(continued)

Table 5.4-2. Main Services and Goods Provided by Nisga'a Businesses (completed)

Service/Goods	Frequency	Percent of Responses	Percent of Cases
Snow removal	2	4.8	9.1
Construction and earth works	3	7.1	13.6
Infrastructure and maintenance	8	19.0	36.4
Total	**42**	**100.0**	**n/a**

Notes: Percent of cases is based on 22 valid cases. Percent of responses may not sum to 100% because of rounding error. Total percent of cases is n/a because it exceeds 100% due to multiple responses.

About 36% of businesses (8) are comprised of one employee (Rescan 2012a). Nearly three-quarters of businesses (16) have five or less employees, while four businesses have more than 20 employees. One business has more than 100 employees.

For approximately 68% of businesses (15) the NLG or Nisga'a municipal governments are an important segment of their client base (Rescan 2012a). On average, various levels of Nisga'a government account for approximately 56% of the customer base of Nisga'a businesses. While some Nisga'a businesses depend on Nisga'a government for as little as 5% of their customer base, there are others who are wholly dependent upon Nisga'a government contracts and purchases. Notwithstanding the importance of the NLG and Nisga'a municipal governments as key clients for many Nisga'a businesses, half of these businesses also provide services to other organizations. For example, six businesses identified social or educational agencies, six identified the provincial government and a further five identified federal agencies as important customers. On average, businesses receive about 45% of their clientele from non-Nisga'a organizations.

The client base of Nisga'a businesses spans a range of industries (Rescan 2012a) although these were dominated by educational services, health care and social assistance, and "other" services (including government). More than half of respondents reported that their clients were engaged in the construction industry. Another 47.6% had clients engaged in the fishing industry, and 42.9% had clients in the forestry industry. Seven businesses had clients in the mining, quarrying, oil and gas industry, and three businesses had clients in the transport and warehousing industry.

5.4.2 Nisga'a Business Investment and Development

Additional information can be deduced regarding the types of Nisga'a businesses that can be expected to benefit from regional development. Without the projects, most respondents to the Nisga'a Business Survey (81.8%) expected their business to grow over the next 10 years (Rescan 2012a). About 18% expected their business to remain the same, and no one anticipated their business would shrink. The main reasons given for expected business growth were new projects starting in the area, intentions to expand to other markets, and community growth.

The two main factors that could limit business growth are capital and existing plant and equipment capacity, mentioned by 81 and 66.7% of respondents, respectively (Table 5.4-3). Other important growth-limiting factors reported included lack of skilled labour and demand constraints; this could also worsen once projects and Nisga'a businesses are increasingly required to compete for skilled and experienced workers.

Table 5.4-3. Main Factors that Limit Nisga'a Business Growth

Factor	Frequency	Percent of Responses	Percent of Cases
Capital	17	35.4	81.0
Existing plant and equipment	14	29.2	66.7
Supplies	1	2.1	4.8
Skilled labour	9	18.8	42.9
Demand	6	12.5	28.6
Concerns about quality or reliability	1	2.1	4.8
Total	**48**	**100.0**	**n/a**

Notes: Percent of cases is based on 22 valid cases. Percent or responses may not sum to 100% because of rounding error. Total percent of cases is n/a because it exceeds 100% due to multiple responses.

Just over four-fifths of businesses have not previously worked for, or with, a mining company, while about one-fifth (four businesses) have. Regardless of their experience working with mining companies, most respondents (over 90%) expressed interest in becoming suppliers to the projects.

Business opportunities of interest for the construction phase were assessed on a seven-point scale, ranging from "not at all interested" to "extremely interested." Of the 19 respondents that were somewhat interested in supplying to the projects, more than half expressed high interest in catering work. Another 47.2% expressed high interest in earthworks and general site services. Camp services opportunities were also of high interest to about 42% of businesses. The less desired business opportunity areas were surveying and medical services, with respectively 63.2 and 57.9% of respondents not interested in providing such services. Conversely, only 10.6 and 21.1% of respondents, respectively, expressed high interest in providing services in those areas.

Interest in business opportunities during the operation phase was slightly lower than for the construction phase. Fourteen respondents (63%) expressed interest in supplying services to the projects during the operation phase. Four respondents (18.2%) reported that they may be somewhat interested and another four (18.2%) stated that they would not be interested at all.

As with the construction phase, business opportunities of interest for the operation phase were assessed, ranging from "not at all interested" to "extremely interested." Of the 18 respondents that expressed some interest in supplying to the projects during the operation phase, one-half expressed high interest in supplying general site services, road maintenance, and snow removal. Another 44.5% expressed high interest in camp catering, and 38.9% expressed high interest in personnel transport. Three respondents indicated that they will be extremely interested in providing other services such as road construction, management, and cultural monitoring.

With respect to local business benefits from the Brucejack Gold Mine Project, these are expected to occur mainly during the operation phase. Supply requirements during construction can be highly specialized and are required in a short time frame, meaning that it may be difficult for small local suppliers to provide a competitive response to procurement requests. During the operation phase there is greater opportunity for local businesses to develop working relationships with the proponent and to develop capacity. The types of purchases for which local businesses are typically

most suited to providing to mine projects include, but are not limited to, expediting services, bus services, trucking, camp catering, security, and road and building maintenance.

Some participants of the focus groups, including youth, discussed the notion that, if the mine projects are developed, additional services may be required such as transportation services or mechanical services for those travelling the Nisga'a highway, and stated Nisga'a people could start small businesses and provide these services. It was common to hear participants (in the Nisga'a villages and Terrace) discuss the challenges of sustaining a business in the Nass Valley, particularly as they had to compete with larger economic centres such as Terrace. Some examples of potential businesses that were suggested to supply the Project included: trucking businesses, a local airport based in the Nass Valley, accommodations such as hotels and bed and breakfasts, and bus shuttle services to the mine sites. One individual stated that he has a trucking business that would benefit if his trucks were used by the mining companies.

In addition to Nisga'a businesses that may develop to supply mine development projects in the region, there is the opportunity for the development of local business because of the projects' induced impacts – that is, the demand for goods and services because of the increase in household incomes. During the focus groups, Nisga'a participants expressed a unanimous desire to have business in the Nisga'a villages. While a number of participants thought new businesses would be developed as a result of the increased populations and incomes with the development of mines, others expressed an opinion that few or no Nisga'a people would become employed and consequently, no new local businesses would be established. Furthermore, without local businesses the Nisga'a villages do not have the capacity to benefit from the increased incomes of those who do obtain mine-related employment. Many participants believe an increase in local wealth would not benefit the Nass Valley but rather that benefits would flow to Terrace.

Nevertheless, many optimistic focus group participants thought the mines and associated increases in population and spending would be good for local business. Some examples of potential businesses that were suggested included: tourism (including fishing lodges and wilderness guides), grocery stores and food suppliers, clothing stores, restaurants and cafes, food processing, and a market for local art.

5.4.2.1 Opportunities and Challenges to Business Growth

From the Nisga'a Business Survey (Rescan 2012a), businesses identified their main costs and risk factors. The most reported costs of running the business were infrastructure and equipment maintenance, supplies, and fuel and transportation, mentioned by over 50% of respondents. Thirty percent of respondents mentioned the cost of personnel, and 30% mentioned the cost of hydro and gas as significant business expenses (Rescan 2012a).

About two-thirds of respondents reported demand volatility as the major risk faced by their business (Rescan 2012a). The second most reported risk was loss of infrastructure. Other notable risks mentioned were: equipment depreciation, highway conditions, health and safety of personnel, supplies on hand, and insurance.

On average, respondents reported positive perceptions about the opportunities a mining project would bring to the region. There were also a high proportion of respondents who expected the

projects to be extremely likely to bring opportunities to the region. Only two respondents (9%) claimed that their businesses would not be able to take on additional work. Eighteen (82%) of respondents reported that their businesses had the capacity to take on more work and two (9%) said that they may be able to take on additional work.

The single largest perceived business challenge is with respect to capital and financing, with more than 30% respondents seeing that as a very likely challenge (Rescan 2012a). There are, however, a larger proportion of respondents (40.9%) that perceived this challenge as not likely than the proportion of respondents (31.8%) that perceived it as a very likely challenge. In addition, 27.3% respondents perceived very likely challenges with existing equipment, and another 22.7% perceived very likely challenges with demand for their products or services (Rescan 2012a). Fewer than 10% perceived hiring skilled labour or product reliability as a very likely challenge.

The majority of respondents reported low scores on their perception of challenges that a mine could bring to their businesses (Rescan 2012a). Only "limited business opportunities if mines are union sites" was considered very likely to be a challenge for more than 36% of respondents (Rescan 2012a). "Shortage of supplies," "contracting packages beyond the capacity of my business," and "mines may directly hire some of my employees" were rated as very likely challenges by fewer than 10% of respondents. Conversely, "shortage of supplies" and "mines may directly hire some of my employees" were considered not likely a challenge by more than 75% of respondents.

The most recommended measures that could be taken by the proponents to assist business in securing work at the mines were "direct negotiations as opposed to competitive bids" and "early payment arrangements," which were regarded as very likely to assist businesses by 57.1% and 52.4% of respondents, respectively (Rescan 2012a). Overall, "joint venture with other firms" and "shorter duration of contracts" were perceived as less likely to assist businesses; correspondingly, more respondents perceived them as not likely to assist their business.

The size of contracts respondents reported to be interested in and able to perform at current business size, without investing any additional assets or hiring any additional staff, ranged from as little as $300 to $25 to $30 million. One-half of the respondents would be interested in contracts of $25,000 or less, while five respondents (28%) would be interested in contracts of $1 million or more. Thus, a number of Nisga'a businesses do report the ability to take on larger contracts.

The lack of appropriate business policies in key areas is a potential barrier to Nisga'a businesses being able to qualify for and secure mine-related contract work. Of the 22 respondents to the Nisga'a Business Survey, 14 did not have a written health, safety, and environment program or manual. Of the eight businesses that do, seven reported that they conduct health, safety, and environment inspections. Most respondents reported that their business do not have a drug and alcohol program (95% or 21 respondents). Only one business had such a program in place.

5.4.2.2 Aboriginal Business Benefits Achieved by NWT and Labrador Mines

The experience of BHP Billiton Diamond's Ekati Diamond Mine (NWT), Rio Tinto/Harry Winston's Diavik Diamond Mine (NWT), and Vale's Voisey's Bay Nickel Project (Labrador) were examined in order to provide a comparative reference point for the evaluation of the Nisga'a business

opportunities. For these three northern operating mines, IBAs were signed between the mining companies and the Aboriginal communities in order to formally define long-term social and economic commitments, including preferential business opportunities (Rescan 2012a).

A 70% spending target was set for the Ekati Diamond Mine during operations with Aboriginal and northern-owned businesses. Aboriginal businesses and joint ventures have secured numerous contracts at the mine, including contracts for mining services, explosives and blasting supply, catering, transportation services, janitorial services, and freight haulage services. The share of total expenditures that have gone to Aboriginal businesses has ranged from approximately 14% in 1999 to 30% in 2003 (years for which data are available).

Vale does not separately report on the share of project expenditures that have gone to Aboriginal businesses. Rather, reporting distinguishes between Labrador and Newfoundland-based businesses. In Labrador, there is emphasis on developing business with majority Aboriginal ownership. This includes a joint effort between the Innu, Inuit, and Vale to expand and grow Aboriginal businesses in and beyond Voisey's Bay. The share of project expenditures that have gone to Labrador businesses (including both Aboriginal and non-Aboriginal businesses) ranged from approximately 23% to as high as 60% between 2003 and 2010.

Diavik committed to purchase at least 38% of total capital expenditures from northern businesses during the mine construction phase and 70% of its goods and services were to be supplied by northern companies during the operation phase each year. This includes both Aboriginal and non-Aboriginal businesses. The actual share of total spending has fluctuated for both northern and Aboriginal businesses over the years. Since 2005, the overall percentage spent with Aboriginal businesses has consistently declined from approximately 50% to a low of about 30% by 2010.

In sum, based on the experiences at the Ekati Diamond Mine, the Voisey's Bay Nickel Project, and the Diavik Diamond Mine, the share of total project expenditures that have gone to Aboriginal businesses has varied widely from approximately 14 to 50%. A number of factors have influenced the success of Aboriginal-owned businesses being successful in their pursuit of business opportunities, including the staff and equipment capacity of the Aboriginal-owned companies, their level of experience and expertise, and their ability to adapt to required operational policies and programs (e.g., health and safety requirements), as well as other project management requirements. These challenges can be expected to be similar for the development of projects in northwest BC.

By comparison, it is estimated in this report that 5% of direct Project's spending during construction and 10% of direct Project's spending during operation will be in the Project region. Further, approximately 10% of the Project's direct regional spending will be on purchases of goods and services from Nisga'a businesses. This is a relatively modest assumption and may not reflect the actual Project spending on Nisga'a businesses as it is unknown which businesses will be able to supply the Brucejack Gold Mine Project, or whether the current business capacity of existing businesses will allow meeting the demand of other projects in the region. However, based on past evidence, it is expected that these estimates are not only achievable but also possible of exceeding the given predictions.

5.5 NISGA'A BUSINESS REVENUE

In 2011, before the planned development of KSM and Kitsault projects, Nisga'a businesses were asked to indicate whether they would be interested in providing services to mines during construction or operations (Rescan 2012a). Businesses that indicated that they would be interested in providing various services were further asked to specify the size of a contract they would be able to fulfil at current size. Approximately 18 businesses expressed interest in providing services with a total value of contracts of $45.1 million and potential spare capacity of $3.0 million; the largest contract was of $30.0 million. The sum of $48.1 million, therefore, can serve as a potential indication of Nisga'a business capacity.[23]

Nisga'a business capacity is assumed to determine the potential value of contracts in the next two to three years as that is the length of a typical contract; consequently, the total business capacity is estimated at $16.0 to $24.0 million per year. The estimated capacity, however, does not indicate the maximum value of contracts awarded to Nisga'a businesses as that is determined through the process of bidding of interested parties. It is beyond the scope of this report to assess the number of Nisga'a businesses that would first, participate in the bidding process, and second, win the bid. Further, it is expected that over a period of time, given that a number of new large scale resource developments will likely take place in the region, Nisga'a businesses would recognize the potential for growth and increase their current capacity, or new businesses would be created to meet the increasing demand for goods and services.

To be conservative, the estimated total cumulative effect of all developments in the region on Nisga'a businesses should not exceed the total capacity of Nisga'a businesses at current size. This is taken into account while estimating the total potential revenue to Nisga'a businesses as a result of the proposed developments in the region. However, as spending from other projects is taken from reported pre-feasibility studies, adjustments are applied not to exceed the capacity.

For each development scenario, the total potential regional business spending due to the projects is estimated based primarily on the information reported in the pre-feasibility and environmental assessment documents available for each project. Using the Nisga'a Business Survey results (Rescan 2012a), total expected business spending in Nisga'a communities is then estimated as a share of the total for the region.[24] The analysis takes into account the type, capacity, and investment intents of existing businesses.

---

[23] It is expected that the total business capacity is underestimated as some responses specified a contract of a very low value indicating an incorrect response; moreover, business owners did not indicate a timeframe while selecting a contract value which required additional assumptions.

[24] Note that the calculation of net business income or earnings, rather than an estimate of gross revenues as relied upon here, requires access to confidential business information on costs and revenues. A general coefficient could be applied across all similar businesses (e.g., as taken from the BC Input-Output Model), but this would add little value to the analysis. Similarly, to comprehensively take into account the opportunity costs in the calculation of revenues and profits (i.e., if the Nisga'a businesses in question are foregoing business in other sectors to sell to the projects) also requires detail on any associated changes in business revenue and cost structures, as well as investment behaviour. For these reasons a meaningful quantitative analysis of net business income or earning, including consideration of opportunity cost, is not feasible.

The results for years 2014 to 2038 are shown in Tables 5.5-1, 5.5-2, and 5.5-3 for development Scenarios 1, 2 and 3, respectively. Economic impact modeling estimates that, for the Brucejack Gold Mine Project, approximately 5% of spending during construction and 10% during operation will be within the region. Estimation of benefits to Nisga'a businesses is based on an assumption that approximately 30% of the expected regional expenditures will go to Aboriginal businesses, one-third of which will accrue to Nisga'a-owned businesses (i.e., approximately 10% of regional spending). This assumption of Aboriginal businesses' share of regional mining expenditures is in keeping with the experiences of other projects (Rescan 2012a), although it is a more conservative estimate in that the share is applied to total spending at the regional rather than the provincial level. Nevertheless, to achieve this level of involvement for Nisga'a businesses in the supply of mine-related goods and services it is also assumed that Nisga'a enterprises will be proactive in their efforts to secure Project contracts.

Table 5.5-1. Expected Revenues to Nisga'a Businesses, 2014 to 2038 (Scenario 1)

	Nisga'a Business Revenues (million dollars)		
Year	Other Projects	Brucejack Gold Mine Project (Incremental)	Total (Cumulative)
2014	$6.2	$0.1	$6.4
2015	$1.0	$0.8	$1.7
2016	$0.6	$1.8	$2.4
2017	$0.6	$1.4	$2.0
2018	$0.6	$1.3	$1.9
2019	$0.6	$1.4	$2.0
2020	$0.6	$1.4	$2.0
2021	$0.6	$1.4	$2.0
2022	$0.6	$1.5	$2.0
2023	$0.6	$1.4	$1.9
2024	$0.6	$1.4	$2.0
2025	$0.6	$1.5	$2.0
2026	$0.6	$1.3	$1.9
2027	$0.6	$1.3	$1.9
2028	$0.6	$1.5	$2.1
2029	$0.6	$1.4	$1.9
2030	$0.6	$1.3	$1.9
2031	$0.6	$1.3	$1.9
2032	$0.6	$1.2	$1.8
2033	$0.6	$1.2	$1.8
2034	$0.6	$1.4	$2.0
2035	$0.6	$0.9	$1.5
2036	$0.6	$0.9	$1.4
2037	$0.6	$0.7	$1.3
2038	$0.6	$0.6	$1.2

Table 5.5-2. Expected Revenues to Nisga'a Businesses, 2014 to 2038 (Scenario 2)

	Nisga'a Business Revenues (million dollars)		
Year	Other Projects	Brucejack Gold Mine Project (Incremental)	Total (Cumulative)
2014	$7.8	$0.1	$7.9
2015	$5.1	$0.8	$5.9
2016	$5.3	$1.8	$7.1
2017	$5.6	$1.4	$6.9
2018	$5.9	$1.3	$7.2
2019	$4.1	$1.4	$5.5
2020	$9.5	$1.4	$10.9
2021	$11.3	$1.4	$12.7
2022	$8.1	$1.5	$9.5
2023	$8.5	$1.4	$9.8
2024	$8.1	$1.4	$9.6
2025	$7.2	$1.5	$8.7
2026	$8.0	$1.3	$9.4
2027	$7.3	$1.3	$8.6
2028	$7.1	$1.5	$8.6
2029	$7.5	$1.4	$8.8
2030	$6.0	$1.3	$7.3
2031	$6.0	$1.3	$7.3
2032	$5.9	$1.2	$7.2
2033	$5.9	$1.2	$7.2
2034	$6.0	$1.4	$7.4
2035	$5.8	$0.9	$6.7
2036	$5.9	$0.9	$6.7
2037	$5.9	$0.7	$6.6
2038	$5.9	$0.6	$6.5

Table 5.5-3. Expected Revenues to Nisga'a Businesses, 2014 to 2038 (Scenario 3)

	Nisga'a Business Revenues (million dollars)		
Year	Other Projects	Brucejack Gold Mine Project (Incremental)	Total (Cumulative)
2014	$7.8	$0.1	$7.9
2015	$6.5	$0.8	$7.2
2016	$6.7	$1.8	$8.4
2017	$6.9	$1.4	$8.3
2018	$6.7	$1.3	$8.0
2019	$4.9	$1.4	$6.3

(continued)

Table 5.5-3. Expected Revenues to Nisga'a Businesses, 2014 to 2038 (Scenario 3) (completed)

Year	Nisga'a Business Revenues (million dollars)		
	Other Projects	Brucejack Gold Mine Project (Incremental)	Total (Cumulative)
2020	$10.3	$1.4	$11.7
2021	$12.0	$1.4	$13.4
2022	$8.8	$1.5	$10.3
2023	$9.2	$1.4	$10.6
2024	$8.9	$1.4	$10.3
2025	$8.0	$1.5	$9.4
2026	$8.8	$1.3	$10.1
2027	$8.0	$1.3	$9.3
2028	$7.9	$1.5	$9.4
2029	$8.2	$1.4	$9.6
2030	$6.7	$1.3	$8.0
2031	$6.7	$1.3	$8.0
2032	$6.7	$1.2	$7.9
2033	$6.7	$1.2	$7.9
2034	$6.7	$1.4	$8.2
2035	$6.6	$0.9	$7.5
2036	$6.6	$0.9	$7.5
2037	$6.6	$0.7	$7.3
2038	$5.9	$0.6	$6.5

Under Scenario 1, total business revenue is estimated to peak at $6.4 million in 2014 (before the construction of the Brucejack Gold Mine Project) and remain at $1.2to $2.4 million level throughout the study period (Table 5.5-1). Incremental net income due to the Project, under all scenarios, is estimated at $0.8 million in 2015, the first full year of Project construction and $1.8 million during the second year. During the operation phase of 2017 to 2038, the contribution of the Brucejack Gold Mine Project to Nisga'a business revenue is estimated to be $0.6 to $1.8 million per year, total revenue of $30.2 million over the life of the mine. Under Scenario 1, due to a low degree of project development in the region, Nisga'a businesses are expected to be underutilized.

Under Scenario 2, cumulative Nisga'a business revenues are estimated to peak at $12.7 million in 2021 varying each year from a low of $5.5 million in 2019 (Table 5.5-2); the total revenue from all projects for the period of 2014 to 2038 is estimated at $200.0 million. Under Scenario 3, total Nisga'a business revenue is similarly estimated to peak at $13.4 million in 2021, varying from a low of $6.3 million, for a total of $219.0 million over the study period (Table 5.5-3).

It is noted that the incremental effect of the proposed Brucejack Gold Mine Project on Nisga'a business activity is predicted to be approximately the same regardless of the amount of other development taking place in the region as defined by the three scenarios. This does not assume that there is unlimited capacity of Nisga'a businesses to expand, but rather that the business capacity is

predicted to be able to meet the demand of the projects (based on the estimated share of total project expenditures within the region).

It is possible that the incremental impact of the Brucejack Gold Mine Project on Nisga'a businesses would be less in the face of greater competition from other projects (i.e., under Scenario 3). It is, at the very least, useful and reasonable to start with the assumption that Nisga'a business impacts due to the Project will be roughly similar under each scenario. This allows a quantitative estimate of potential demand around which Nisga'a businesses can make plans and consider their desire to expand.

More projects likely translate to more demand for Nisga'a goods and services, given that they remain competitive relative to other suppliers. Potentially, the incremental effect of the Brucejack Gold Mine Project may decrease if Nisga'a businesses are not able to meet all demand because they choose to focus their resources elsewhere to work on other projects, or increase if Nisga'a businesses decide to expand or new businesses are established. Under such circumstances, Nisga'a businesses will face strategic decisions as to where and with whom they choose to do business. It is not possible to quantitatively estimate the extent to which this may occur and, thus, the resulting changes in the incremental economic effects of the Project. Ultimately, the realized incremental value of the Brucejack Gold Mine Project will be a result of the development of business relationships.

5.6 NISGA'A NATURAL RESOURCE RELATED EARNINGS OR VALUE

5.6.1 Availability and Accessibility of Resources

The ESCIA Guidelines identify changes to natural resource activity and related employment and income that Nisga'a might secure from the harvest and use of such resources as a potential impact of Project components and activities. These concerns are principally about effects on Nisga'a run tourism, guide outfitting, and similar businesses that rely on the integrity of cultural and natural landscapes and resources (e.g., wild game species). To assess these issues, this section addresses impacts on Nisga'a natural resource use for commercial purposes. Related effects on commercial natural resource activity employment and income are assessed in Sections 5.6.2 and 5.6.3.

Nisga'a Nation, as defined under the NFA, possesses the ownership of approximately 2,000 km^2 of Nisga'a Lands. The lands offer wilderness and cultural experiences for Nisga'a citizens and visitors as well as a potential for sustainable development of natural resources such as timber industry or mineral extraction. Jobs associated with the natural resource sector include fishing, guide outfitting, mineral and energy resource exploration, recreation and tourism, and timber harvesting.

The Nisga'a Lands have a well-developed forestry sector that is managed to provide employment opportunities for Nisga'a people. The forest also provides potential for harvesting of non-timber forest products that include eleven different mushroom species, as well as fiddleheads; these are recognized as an important economic resource for the Nisga'a Nation. The forest also provides recreational attractions in the form of parks and ecological reserves, campgrounds and picnic sites.

Fishing and wildlife harvesting are important aspects of Nisga'a tradition that support economic base in the communities. The NFA gives the right to Nisga'a people to harvest salmon and other fish in approximately 26,838 km^2 of territory known as the Nass Area and to hunt in approximately 16,101 km^2 known as the Nass Wildlife Area.

Finally, Nisga'a possesses all mineral resource rights on or under Nisga'a lands including precious and base metals, coal, petroleum, natural gases and geothermal resources, as well as gravel, rock, stone and sand. In the recent years, the resources of gold, silver and copper have driven the economic development on and around Nisga'a Lands with more projects coming to the region and several projects in the development stage. It is estimated that mines provide as much as 30% of jobs for communities along Highway 37 and this share is expected to increase as more mining companies move into the region. Consequently, it is expected that Nisga'a communities will become economically more reliant on the mining sector.

Although a number of traditional natural resource use activities take place on Nisga'a Lands, in the Nass Wildlife Area and elsewhere in the Nass Area, Nisga'a citizens are not known to actively use areas within the vicinity of the Brucejack Gold Mine Project. The Project is not located in the Nass Wildlife Area and is not on Nisga'a Land (Figure 1.1-1). Therefore, the Project is not expected to directly affect Nisga'a harvesting activities or Nisga'a land-based activities related to the use of those lands. However, as certain components of the Project are located in the Nass Area (Section 1.1) there is the potential for the Project to interfere with commercial activities if they do happen in proximity. The main potential for interaction with Nisga'a land use activities is with respect to use of the Brucejack Access Road, but this is expected to be negligible given the limited area of interaction.

Nevertheless, as other projects are located in both the Nass Area and Nass Wildlife Area, there is the potential of cumulative effects of the projects on Nisga'a citizens' availability and accessibility to resources for commercial uses. These effects may result in changes to resource-based employment, changes to aquatic and timber activities, and changes to commercial recreational/guide outfitting activities. Lacking the necessary detail regarding the specific timing, location, and characteristics of activities for all projects considered in this assessment, it is not possible to reasonably estimate the cumulative effect. However, the contribution of the Brucejack Gold Mine Project to the cumulative and cumulative-incremental impact is predicted to be negligible.

5.6.2 Natural Resource Activity Employment

Forestry and fishing, and currently also mining, are the key economic drivers of the region that form the economic base of local communities and provide substantial employment opportunities. However, with the increase in mining activities in the region it is expected that the natural resource activities will be impacted. The cumulative assessment of the projects indicates that Nisga'a natural resource use activities such as fishing and forestry will likely experience some increase in competition for labour, particularly under circumstances of high regional development as described in Scenario 3. Some businesses, may find it difficult to compete with the mining sector, at least for those employees with the appropriate skills and ability (and willingness) to work for the projects.

Recent data from 2013 indicates that in BC there were approximately 19,200 people employed in forestry and logging, 1,700 in hunting and trapping, and as many as 37,000 employed in mining, oil, and gas. For comparisons, in 2003 these statistics corresponded to 27,100, 4,400, and 13,100, respectively. That indicates that the number of employed in forestry and logging, over 2003 to 2013, decreased by approximately 29.2%; in hunting and trapping the decrease in the number of employed was approximately 61.4%. In contrast, mining, oil and gas experienced an increase in employment of approximately 64.6% (BC Stats 2013a). Therefore, the number of employed in the

traditional resource-based activities decreased over the 10-year period, whereas the number of employed in the mining and energy sectors increased. This points to an increasing reliance of local economies on the extractive sectors.

The availability of skilled labour as a main factor that limits business growth was noted by approximately 43% of respondents to the Nisga'a Business Survey. However, fewer than 10% perceived hiring skilled labour as a "very likely" challenge that a mine in the region could bring to the local economy and their own business; rather, the increased demand for a local workforce was seen as a positive opportunity by more than two-thirds of respondents. The challenge that "mines may directly hire some of my employees" was rated as "very likely" by fewer than 10% of respondents, while conversely it was considered not likely a challenge by more than 75% of respondents. Overall, the results of the Nisga'a Business Survey indicates that some adverse impact on local businesses due to labour market demands is expected, but it is not believed to be a pervasive issue across Nisga'a businesses (Rescan 2012a).

Beyond these observations, it is difficult to predict with more specificity the significance of the labour market of the Brucejack Gold Mine Project and other projects on Nisga'a commercial natural resource use activities. It is however expected that, although there will be a shortage of skilled workers in the short run that will put pressure on the market for labour, in the long run the projects will act cumulatively by increasing employment levels in the local and regional communities without substantial competition for labour. Some evidence is available from the Nisga'a Business Survey (Rescan 2012a) as previously discussed in Section 5.4.2 (under Opportunities and Challenges to Business Growth).

The impacts on individual businesses are expected to be highly variable, depending on the extent to which the respective labour markets overlap (i.e., in terms of the economic structure of the communities in question, labour force skill sets, labour force experience, geography, and wage levels). However, such pressures on individual businesses due to competition in the labour market is a natural and, in the long term, desirable feature of economic development.

The following section provides additional analysis on competition for labour in the natural resource sectors.

5.6.3 Competition for Labour in the Natural Resource Sectors

The provision of Project employment may serve to attract skilled workers who are currently employed, indirectly creating the need to replace those skilled workers. This may result in an increased need for skilled and experienced labour in non-mining sectors and local communities if workers decide to leave their current positions. Consequently local businesses may encounter additional business cost of training new employees or increasing wages to retain current employees. This section looks at sources of labour competition in the two main natural resource sectors in the region, mining and forestry, and further describes the expected extent of competition for labour to local business.

5.6.3.1 Mining

Demand for skilled workers continues to increase, especially in rural communities where most of employment and economic growth is to occur as a result of expanding or proposed new developments (TLA 2014). As of July of 2014, there were 1,989 workers in BC's oil and gas, 13,427 in mining and quarrying, and 7,853 is support activities for mining and oil and gas extraction (Statistics Canada 2014a). Depending on economic growth, the British Columbia mining industry will need to recruit over 15,000 workers by 2022. An estimated 68% of those would be in mining and 24% in exploration, with the remaining required for occupations in stone, sand and gravel industry. Of that, it is estimated that the North Coast will require 1,580 workers for mining, exploration, and stone, sand and gravel occupations. More than a half of all replacement requirements will be a result of retiring workers. An aging population and fewer young people to enter the labour market will consequently challenge the BC mining labour market. The mismatch of skills and training will further contribute to this effect (MiHR 2012).

The ability of the mining industry to attract skilled and experienced workers from other sectors is also limited by unfavorable public perception factors related to working or living in remote locations such as high cost of living in remote communities, access to recreation and leisure activities, and the pressures of a "fly-in fly-out" lifestyle (MiHR 2012). Consequently, the focus of the mining sector is often on hiring and training workers from local communities; however, that requires substantial investment in training and education.

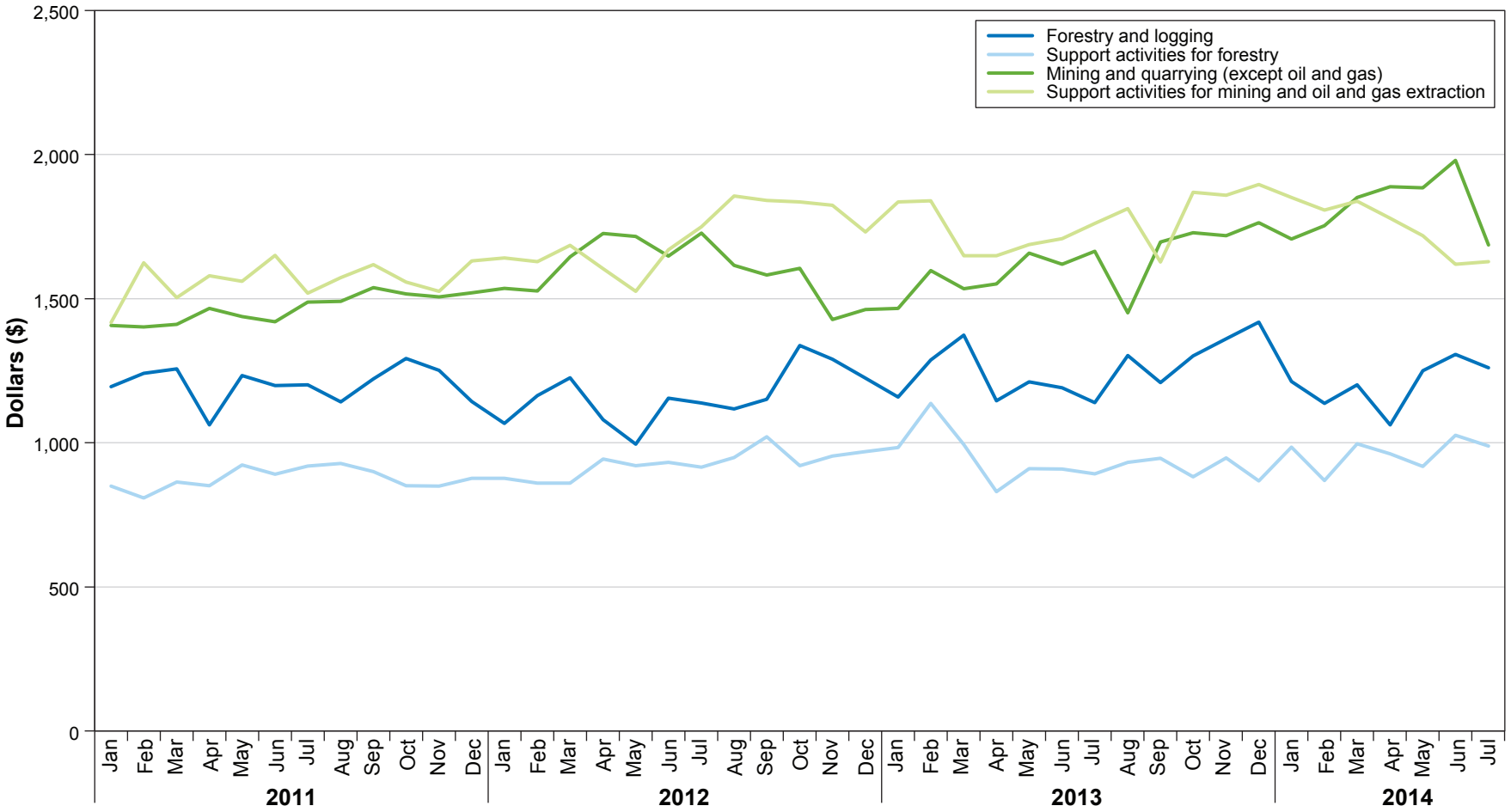
To compensate, the mining industry offers some of the highest wages to be able to attract workers (Figure 5.6-1). However, the shortage of skilled and experienced workers continues to contribute to the upward pressure on wages (Figure 5.6-1). Significantly higher wages have been the key attractant for workers to join the mining sector.

In other to address the potential shortage for skilled and experienced workers, BC mineral exploration and mining companies identified the top ten occupations in the province that face the highest challenges in recruitment and retention, both now and in the next years (MABC 2014b). The top ten occupations to be in demand over the ten years include:

- Geologists;
- Mining Engineers;
- Accountants;
- Heavy Duty Equipment Mechanics;
- Electricians (surface);
- Metallurgical Engineers;
- Millwrights;
- Maintenance Supervisors;
- Chiefs, Managers & Superintendents;
- Mechanical Engineers; and
- Mining Supervisors.

Figure 5.6-1

Weekly Wages in Forestry and Mining, BC



5.6.3.2 Forestry

BC's forest industry is also challenged with an insufficiently skilled and experienced workforce (TLA 2014). Behind this shortage is the narrowing youth demographics and the competition for workers from other industries and provinces. A decreasing number of youth considers employment in the forestry industry as a result of better employment prospects in other industries and a negative public perception of the forestry industry (TLA 2014). Further, labour shortage in the forestry sector is a challenging issue as the current vacancy rates are substantially above the provincial industry averages (2 to 4% for the private sector). Specifically, vacancy rates in logging occupations range from 6.9% for logging machinery operators to 17.2% for hand fallers (TLA 2014). The decreased ability of wages in the forestry sector to compete with wages in the mining industry further increases the labour shortage problem.

However, forestry still represents a large chunk of the provincial employment in BC. As of July 2014, there were 12,384 workers in forestry and logging and another 6,261 in support activities for forestry (Statistics Canada 2014a). Of the total forestry related employment, an estimated 49% of employees work in industry, 23% in paper manufacturing, 16% in forestry and logging, and 12% is support activities for forestry (TLA 2014). Also, a substantial number of new job openings are going to be created over the 2022 horizon. Occupations identified as either experiencing skill shortages, now or expected in the near term (TLA 2014), include (for coastal and interior regions):

- Logging Machinery Operators (1,793);
- Logging Truck Drivers (1,775);
- Hand Faller (1,312);
- Logging Worker (1,311);
- Forestry Technician (797);
- Ground Worker (513);
- Heavy Equipment Operator (490);
- Forestry Professional (471);
- Forestry Worker (461); and
- Heavy Duty Mechanic (428).

5.6.3.3 Cost to Local Businesses

The potential costs to local businesses as a result of labour market competition can come from a shortage of skilled and experienced workers, resulting inflationary pressures on wages, and additional cost of training or retaining new employees. Over the short term, the competition for skilled labour will take place if there is a shortage of skilled and experienced workers, if skilled workers have transferable skills, and if other sectors can offer competitive wages and benefits.

As indicated in Sections 5.6.3.1 and 5.6.3.2, there is shortage of skilled workers in the mining and forestry sectors. Although it is not clearly defined what skills and experience are required for specific positions, the mining and the forestry sectors as well as other sectors, have the potential to offer overlapping

occupations that can lead to competition for employers. Workers with transferable skills would be expected to, in general, select a position offering higher wages and benefits. For example, of the top occupations in demand identified over the 2022 horizon, heavy duty mechanics will be required for both the mining and forestry sectors; this is one of the positions expected to face competition from employers.

Wage data and wage inflation are also important indicators of labour shortages. Industries where employers must offer increasingly higher wages to attract employees as compared to other industries are an indication of an overall shortage of skilled workers. However, that is not the case for forestry. Figure 5.6-1 shows the historical weekly wage for activities in the forestry sector. As evident, although there are current labour shortages, the wages haven't increased significantly over the last four years. In fact, in January of 2011 the average weekly wage in forestry and logging was $1,194, whereas in July of 2014 it was only $65 higher. To compare, the average weekly wage in the mining sector increased by $280 over the same period of time (Statistics Canada 2014b). Another industry that experienced a $270 increase in the average wage over the same period of time is the heavy and civil engineering that is strictly tied to the mining industry. Other sectors had more modest wage inflation, similar to that of the forestry sector (Figures 5.6-1 and 5.6-2). Consequently, wages in the forestry sector do not appear to experience significant wage inflation or inflation similar to that of the mining sector. This is an interesting fact as labour shortage and the competition for labour is an ongoing issue in the region; however, that has not been reflected in historical earnings data for sectors other than the mining sector. As a conclusion, it appears that there is competition for labour either mostly within the mining sector where mines compete for workers, or that the competition that spills over to other sectors does not impose substantial additional costs in terms of higher wages. This could be due, at least in part, to the fact that few employers can compete with the mining sector by increasing the wage level enough to retain workers.

Overall, there is the potential for the labour market to respond with some upward pressure on labour demand and wages, and consequently increase labour market competition among local employers. Given past evidence, this competition is unlikely to increase the sectoral wages substantially; however, it is possible that employers will be faced with other costs such as the cost of acquiring and training new employees. Further, it is not possible to estimate the magnitude of the costs to local business as there is a lack of detailed information on the number of workers with transferable skills from local communities. In addition, much of the realized impact will be dependent on the personal choices of workers. Beyond these observations, it is difficult to predict with more specificity the significance of the labour market and wage impacts on local businesses.

5.6.4 Natural Resource Activity Income

The Nisga'a Business Survey (Rescan 2012a), discussed in Section 5.4, identified concerns of wage impacts induced by large scale developments as increased demand in the regional labour market can be expected to result in wage inflation pressures. In the Nisga'a Business Survey, the cost of personnel was mentioned as a main cost of running a business by more than 30% of respondents to the business survey across all sectors surveyed (Rescan 2012a), indicating that these businesses may be susceptible to wage inflation. The inflation of local prices or wages due to existence of a new project was viewed as a likely challenge by approximately 36% of respondents, but only about 9% viewed it as "extremely likely" (Rescan 2012a).

Figure 5.6-2

Weekly Wages in Selected Industries, BC

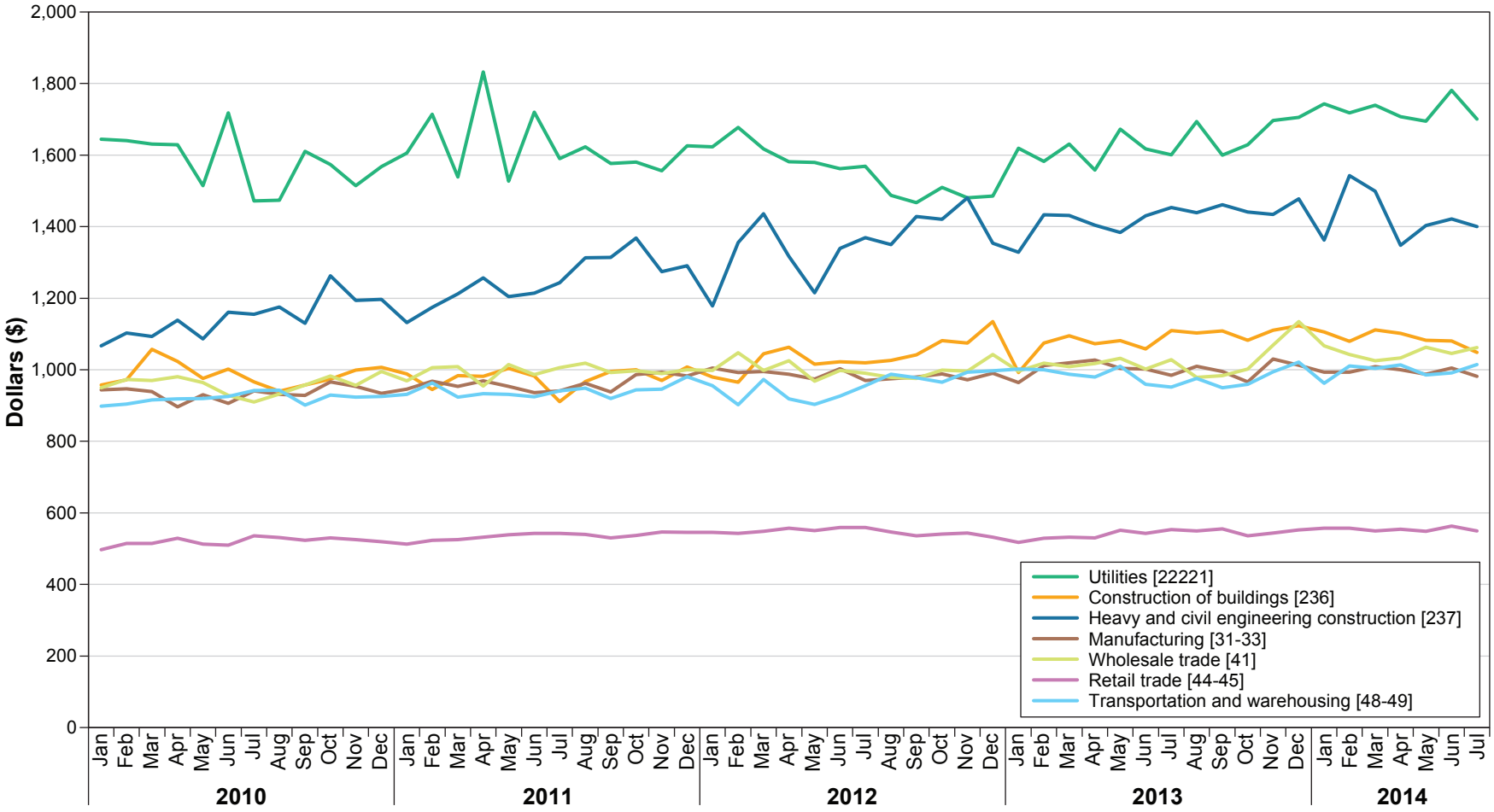


Table 5.6-1 presents average annual wage for BC goods and service producing industries. It is predicted that the average wage paid by the Brucejack Gold Mine Project will be greater than the average wage currently paid in the region (see Section 5.3; Statistics Canada 2007; BC Stats 2011). For example, the BCIOM predicts that during construction the annual wage at the Project would be approximately $154,000, whereas during operation of the mine, it would be approximately $119,000. It is predicted that Nisga'a employees of businesses directly and indirectly supplying the Project would conservatively earn approximately $60,000 per year.[25] However, it is not expected that this wage will differ markedly from the earnings of skilled and experienced Nisga'a workers currently active in the fishing and forestry sectors. Nevertheless, other Nisga'a commercial natural resource use activities will likely need to explore means to increase productivity and competitiveness in the labour market if other projects are developed and broader-based regional development is realized.

Table 5.6-1. BC Industrial Comparison of Average Annual Wage

Industry	Average Annual Wage
Goods Producing Industries	
Agriculture	$37,305
Forestry, Fishing, Mining, Quarrying, Oil &Gas	$69,949
Utilities	$66,049
Manufacturing	$52,367
Construction	$55,905
All Goods Producing Industries	$55,890
Service Producing Industries	
Transportation & Warehousing	$52,509
Retail and Wholesale Trade	$32,751
Finance & Related	$50,350
Professional, Scientific and Technical Services	$65,983
Educational Services	$50,234
Health Care & Social Services	$45,646
Accommodation and Food	$22,838
Public Administration	$66,204
All Service Producing Industries	**$44,247**

Source: BC Stats (2013a).
Note: Average annual wage is based on average weekly earnings in the specific industry as of October 2013.

[25] Note that this is a conservative, lower estimate assuming that most Nisga'a are employed in lower paying job categories. In addition, supplier businesses typically pay employees less than what would be earned working directly for the Project.

5.7 NISGA'A LISIMS GOVERNMENT REVENUES AND EXPENSES

5.7.1 Expenditures

The Brucejack Gold Mine Project, as well as other prospective projects being developed in the region, is expected to increase government spending. NLG may sustain expenses in relation to participation in EA processes, such as pre-Application and Application review, as well as during on-going monitoring of the Brucejack Gold Mine Project or other projects. The Project is not expected to induce large government spending on its own; however, its effects may combine with the effects of other projects to produce a cumulative impact. Here, existing sources of NLG expenditures are described as well as the expected cumulative effects of the prospective projects on those sources.

NLG Expenditure Sources

In the fiscal year ending March 31, 2013 the vast majority of NLG finances flowed through the Government and Administration Fund, including approximately $24.2 million in transfers to the Nisga'a Village Governments, $16.0 million to the Nisga'a Valley Health Authority, and $7.2 million to Nisga'a School Board #92, among others (NLG 2013), for a total of approximately $51.3 million. For year ending March 31, 2013, NLG expenses included approximately $5.9 million for administration; $4.6 million for governance; $3.2 million for lands and resources; $2.9 million for programs and services; and $2.0 million for fish, wildlife, and migratory birds. Expenses totalled approximately $24.6 million for the year. This was a 7.3 percent increase in expenses from the year before.

Project Related Review and Monitoring Costs

It is expected that there will be expenditure components to support the review of the Brucejack Application/EIS, as well as costs associated with any participation of the NLG in the review of ongoing environmental and socio-economic monitoring for construction, operation, closure and post-closure phases of the Project. Estimates of these costs are not provided here because they are to be the subject of subsequent discussions between the Proponent and governments (including the NLG).

Participation of the NLG in monitoring and/or responding to social and cultural impacts occurring in the Nisga'a communities is a question of community priorities and the focus of NLG governance. These issues are best determined at the appropriate time by the communities through the NLG.

Review and monitoring costs can vary depending on the level of involvement and scope of the review and monitoring work. Without knowing the scope and approach that the NLG intends to take with respect to social and cultural monitoring, or at what points it will decide investment in further infrastructure is required, it is not possible to estimate the costs of such a program in general nor the specific cost burden that might fall on NLG. At this point in time, it is not possible to provide a reasonable estimate because of a lack of clearly defined needs and associated resource requirements necessary to carry out such work. It is expected that further discussions will be had with NLG to better define, at an appropriate time, its participation and Pretivm's support for this participation in any environmental or socio-economic monitoring program that may be required for the Brucejack Gold Mine Project.

5.7.2 Revenues

The Brucejack Gold Mine Project, as well as other prospective projects being developed in the region, is expected to affect, either positively or adversely, the revenues of NLG. Positive impacts on the revenue may relate to additional earnings from a Revenue Sharing Agreement, if one is established for the Project or any other project, IBA-related income, and/or Nisga'a Own Source Revenue Agreement. The construction and operation of the Project may not notably increase the NLG revenue; however, the effects of the Project combined with the effects of other projects have the potential to produce a substantial collective positive impact on revenues. This section, therefore, describes, existing sources of NLG revenues and the anticipated cumulative effects of the prospective projects on those sources.

NLG Revenue Sources

NLG's annual revenues total approximately $99.8 million, with an annual excess of revenues over expenses of approximately $23.9 million in 2013 and an accumulated surplus of over $201.2 million (fiscal year ending March 31, 2013; (NLG 2013). The largest portion of the revenue, approximately $56.0 million, came from Fiscal Financing Agreement and related funding; $26.0 million from investment income; $4.4 million from tax revenue, $2.3 million from interest income of Final Agreement; $1.8 million from targeted funding (AANDC); $1.6 million from government business income; $0.6 million from contribution from Lisims Fisheries Conservation Trust; $0.6 million from business enterprise income; and, $4.4 million from other sources. NLG's finances are administered through a number of funds, namely:

a) Government and Administration Fund (consists of the operations and administration of the general NLG);
b) Commercial Fisheries Fund (consists of the operations of the commercial fisheries programs);
c) Business Development Fund;
d) Capital Transfer Fund;
e) Investment Fund (consists of NLG's investments in various business and non-business ventures);
f) Tangible Capital Asset Fund; and
g) Capital Finance Commission Fund.

Business organizations included in the consolidated reporting of the financial affairs of the NLG are: Nisga'a Fisheries, enTel Communications, Lisims Backcountry Adventures, The Nisga'a Scoop, Nisga'a West Coast Stevedoring, Nass Area Properties, Nass Area Enterprises, and Lisims Forest Resource. These commercial entities are invested in by NLG and, in turn, NLG receives operating surpluses.

Based on the results of the assessment of the potential effects of the Brucejack Gold Mine Project on Nisga'a business and natural resource activity , or the cumulative effects of all projects in the region

(especially under Scenario 3; Sections 5.2, 5.3 and 5.5), it is not possible to reasonably estimate the effects, either positive or adverse, on revenues to the NLG, although across the portfolio substantial impacts are believed to be unlikely given the business sectors in which the NLG have invested and the location and characteristics of the project impacts expected. Overall, the Brucejack Gold Mine Project, as well as other developments, is expected to have a positive impact on NLG revenues through the sharing of mining revenues from the Project, the goal of BC's Resource Revenue Sharing policy, or an IBA should they be established.

Resource Revenue Sharing

Resource revenue sharing is intended to ensure that some of the economic benefits, beyond jobs, generated by resource use accrue to local, and in particular to Aboriginal residents. These agreements are between a potentially impacted Aboriginal group and the government.

In the context of the Brucejack Gold Mine Project, any revenue sharing is to take into account the Nisga'a Nation Own Source Revenue Agreement as defined in the NFA. Nisga'a Nation's own source revenue capacity includes the "…percentage of the aggregate of the own source revenue capacities for the fiscal year in respect of commercial and investment activities, Nisga'a taxes, Nisga'a settlement trusts, charges and fees and other Nisga'a revenues, as determined in accordance with [the] Agreement" (AANDC 2010).

A revenue sharing agreement is not in place for the Brucejack Gold Mine Project. The Province of BC has negotiated two revenue sharing agreements to date (referred to as Economic and Community Development Agreements) with First Nations. One agreement is with the Skeetchestn (Skeet-che-sen) Indian Band and the Tk'emlups (Kamloops) Indian Band for the New Afton mine near Kamloops. The second agreement is with the McLeod Lake Indian Band for the Mount Milligan mine (located between Mackenzie and Fort St. James). The amount of BC Mineral Tax revenue shared with First Nations is negotiated on a project-by-project basis. It is based on several factors such as the size of a proposed project, the nature and interests of an Aboriginal community, and the potential impacts of a project.

With respect to the Brucejack Gold Mine Project, it is not possible at this time to provide a reasonable estimate of the net benefit to the NLG from any revenue sharing that may be developed. The terms of such an agreement, including the formula for any revenue sharing, is the subject of negotiation requiring the involvement of both NLG and the Government of BC.

5.8 CUMULATIVE-INCREMENTAL EFFECTS ON NISGA'A ECONOMIC CONDITIONS

The preceding analysis presented in Section 5 reviewed the potential for effects to Nisga'a economic conditions as a result of the Brucejack Gold Mine Project at differing levels of regional development (described in detail in Section 2.2.4). As discussed in an integrated fashion through this chapter, economic modelling and analysis further predicted the potential for economic benefits and challenges associated with other regional development projects; hence, the potential for cumulative-incremental effects to Nisga'a economic conditions has been considered as part of the Economic Impact Assessment (Section 5).

5.9 SUMMARY OF ECONOMIC IMPACTS

The assessment of economic impacts of the Brucejack Gold Mine Project focused on the analysis of Nisga'a employment and income, Nisga'a business activity and revenues, Nisga'a natural resource activity and related employment and income, and NLG revenues and expenditures. Three development scenarios, each with a different degree of regional development, were considered to assess the level of employment and business opportunities in Nisga'a communities. Further, the effects were evaluated to consider the incremental impacts of the Project on local communities over the period of 2015 to 2038 and the cumulative impacts of all other projects in the region. The examination of the scenarios and the cumulative-incremental effects were used to estimate the potential effects in Nisga'a communities where employment and business activity were assumed to be the main economic drivers of regional development.

The assessment of Nisga'a employment effects focused on the investigation of labour demand from all projects in the region under the low, medium and high development scenarios. Project employment estimates indicated that the total demand for workers would be up to approximately 927 under Scenario 1, or as many as 4,774 under high regional development, Scenario 3. Cumulatively, it is estimated that the number of jobs for Nisga'a would range between a low of five to a high of 416 jobs depending on the number of projects approved and the project phase. Currently, the level of skill and training, as well as relevant work experience remain significant barriers to the employment of Nisga'a citizens.

The investigation of the scenarios indicated that the Brucejack Gold Mine Project could generate approximately 10 person-years of employment during the construction phase and 721 person-years of employment (25 to 36 full time positions per year) during operations for Nisga'a citizens. Moreover it was estimated that under Scenario 1, for the period of 2015 to 2038, the Project would represent over 50% of total labour demand from all projects for skilled Nisga'a workers. Cumulatively, under Scenario 1, as many as 61 jobs for Nisga'a could be created. Under Scenario 2, as many as 242 Nisga'a workers would be hired from Nisga'a communities, with the demand from the Brucejack Gold Mine Project representing up to 25% of the total demand. Under Scenario 3, as many as 416 jobs would be created from all Projects for Nisga'a workers, with the demand for Nisga'a workers from the Project representing up to 12%.

The three development scenarios were also used to estimate the potential net personal income to Nisga'a citizens from the Brucejack Gold Mine Project. The total net income effect of the Project is estimated to be approximately $0.2 million per year during construction and approximately $1.0 to $1.4 million per year during the operation. Cumulatively, assuming high regional development (Scenario 3), net personal incomes will total approximately $8.6 to $16.6 million per year for the period of 2014 to 2038; however, what is actually achieved will be dependent on the number of projects approved, the project phase, and the number of Nisga'a citizens who are able to obtain mine employment. Overall, under Scenario 1, the cumulative total net income effect is estimated to be $55.4 million, under Scenario 2 $171.4.0 million, and under Scenario 3 approximately $338.9 million over the period of 2014 to 2038.

Revenues to Nisga'a businesses from the development of the Brucejack Gold Mine Project are estimated to reach $0.6 to $1.8 million per year from 2015 to 2038. Cumulatively, assuming high regional development (Scenario 3), Nisga'a businesses are expected to gain approximately $6.5 to $13.4 million per year in business revenue, again depending on the number of projects approved, the project phase, and the realized involvement of Nisga'a businesses in providing goods or services to the mining sector. The two main factors that can limit Nisga'a business growth are capital and existing plant and equipment capacity. The Brucejack Gold Mine Project is expected to source a number of goods and services from regional suppliers.

Additionally, cumulative effects of the Project and other developments in the region are expected to have an adverse effect on Nisga'a natural resource commercial activities. Nisga'a natural resource activities, including fishing and forestry, will likely experience an increase in labour competition, particularly if high regional development occurs. It is not expected that the wages offered by the mining sector will differ markedly from the earnings of skilled and experienced Nisga'a workers currently active in the fishing and forestry sectors. Nevertheless, other Nisga'a commercial natural resource activities will likely need to explore means to increase productivity and competitiveness in the labour market if other projects are developed and broader-based regional development is realized.

Overall, the incremental economic impacts of the Brucejack Gold Mine Project and cumulative economic impacts of all projects in the region are driven by employment and business activity and will depend on the number of projects approved, the number of Nisga'a citizens that seek and obtain employment with regional development projects, as well as the number of businesses interested in and able to supply directly or indirectly to the projects.

6. SOCIAL IMPACT ASSESSMENT

6.1 ASSESSING SOCIAL IMPACTS

Section 3 explains the rationale and outcomes of the scoping process used to identify the social issues or attributes of Nisga'a life considered most susceptible to impacts from the Project and from resource development in general. The main social impacts that may be experienced by Nisga'a citizens and communities in relation to the Project include:

- Housing;
- Community infrastructure (in the Village of Gitlaxt'aamiks);
- Community services;
- Community well-being; and
- Nisga'a worker health.

Project activities and components, including direct, indirect, and induced employment and Project expenditures on goods and services, are expected to produce pathway or intermediate effects, which in turn may impact Nisga'a citizens and communities and, notably, the VCs specified in Section 3.4. The key intermediate effects identified for this assessment include Project-induced migration and population change, and Project-related incomes and work schedules (i.e., specifically shift work).

Project-induced Migration and Population Change

The potential migration of people to, or back to, the Nisga'a villages in response to economic opportunities during construction and operation of the Project, and possible depopulation during closure and post closure, could result in a number of social effects. Population growth on Nisga'a Lands is likely to create more demand for housing, social services, and facilities.

Project-related Incomes and Work Schedules

Job creation and other Project related economic activities are generally expected to increase disposable income levels in the communities which research has shown can lead to a range of social issues linked to increased alcohol consumption and substance abuse which, in turn, can contribute to child neglect, family and community violence, and other social problems (Brockman and Argue 1995; Archibald and Crnkovich 1999; Labrador West Status of Women Council and Femmes Francophone de l'Ouest du Labrador 2004; NAHO 2008; CCSG Associates 2004). Negative or disruptive behaviours enabled by higher incomes may extend beyond the household to have adverse effects on community well-being in general (Gibson and Klinck 2005). In some cases higher incomes can increase income disparity which, in small, tightly knit communities, such as the Nisga'a villages, can lead to friction between different groups and/or individuals in the community (NAHO 2008).

Mining related shift rotations have also been linked to adverse impacts on family dynamics, as well as imbalanced distribution of domestic responsibilities, strains on spousal relationships, and difficulties for children adjusting to extended periods of absence of a parent (InterGroup 2005).

6.2 HOUSING

The net impact of the Project on housing in the Nisga'a villages is directly related to migration and population change. Existing housing stock in each community and current levels of occupancy are summarised in Appendix 1. Data from the Statistics Canada 2006 census indicates an average of 3.4 persons per household in the three Nisga'a villages for which statistics data were available (Statistics Canada 2007).[26] According to the Nisga'a focus group interviews and based on communication with Nisga'a administration, the number of people per household is considerably higher than that recorded by the 2006 census, with some estimates in the range of 4 to 8 persons per household. Notably, recent community research (2014) indicated that, for Nisga'a, the number of people per household may denote overcrowding or may potentially represent a cultural preference to live with extended family (Gitlaxt'aamiks Village Government, pers. comm.). Couples with children accounted for 37.5% of households in the Nisga'a villages, although it is not uncommon for households to consist of more than one family or of groups of unrelated adults. In 2006, less than a fifth (18.8%) of households was comprised of couples without children.

Approximately 40% of the housing stock in the Nisga'a villages was constructed prior to 1986 (Statistics Canada 2007). In 2006, the percentage of housing in need of major repairs across the province was 7.4% compared to at least a third of all housing in the Nisga'a villages. There is a small stock of temporary accommodations (e.g., motel, bed and breakfast, RV campground) available in Gitlaxt'aamiks and Gitwinksihlkw with a total temporary capacity of about 272 units.

Information from key person interviews with Nisga'a housing administrators and commentary obtained from the focus group interviews indicate that in general, housing in the Nisga'a villages is at or near capacity and that over-crowding in some residences is already a problem. The need to expand housing in their communities was a view expressed in virtually all focus group interviews that took place both in the Nisga'a villages and in Terrace and Prince Rupert. For those living off of Nisga'a Lands, lack of adequate housing was seen as a primary deterrent for people who might otherwise consider moving to (or back to) the Nass Area. In at least one of the Nisga'a villages the land base limits the capacity of the community to increase its stock to meet growing needs, while in other communities subdivisions have been established or are well into the planning stages. Focus group participants indicated that there are a number of serviced housing lots which could accommodate newcomers if they were able to afford construction of a new home.

Any potential impact of mine related employment on migration to the Nass and, thereby, on housing in the Nisga'a villages, is tempered by the fact that the Proponent will provide transport to and from the mine on a shift rotation basis (e.g., two weeks on and two weeks off) and that camp accommodation will be provided on site while workers are on shift. For Nisga'a living outside the Nass Area, mine employment does not necessitate, nor provide a direct incentive, to move to (or back to) the Nisga'a villages. In a net out-migration, or "no change" scenario, the mine will

[26] Statistics Canada practice is to not report statistics for exceptionally small communities, such as Laxgalts'ap, to help ensure the anonymity and confidentiality of census respondents.

obviously have no impact on housing issues in the Nisga'a villages. If, however, it is assumed that those individuals whose main reason for moving away was to find work, then the population models presented in the Section 4 indicate that during construction and the first few years of operation Nisga'a villages may experience a net influx of people (i.e., around ten per year in the moderate net in-migration scenario and about two dozen per year in the high net in-migration scenario). Recent community research indicated the main reasons people leave the Nass Valley include the lack of education, employment, and housing options (Gitlaxt'aamiks Village Government, pers. comm.).

For those willing to take up residence in temporary accommodations (motel, bed and breakfast, or RV campground) there is sufficient capacity to house people moving into one of the Nisga'a villages on a short-term basis as a result of construction phase employment, especially if the worker is single or part of a couple without children. For those migrating in for the long-term, or with children, requirements for permanent or semi-permanent accommodation will put an immediate burden on housing infrastructure.

The lack of adequate housing in the Nisga'a villages could lead to three possible effects, although the actual outcome is likely to be a combination of these factors:

a) a net influx of people to the Nisga'a villages may lead to an increase in over-crowding in some households;

b) over-crowding may be a disincentive for some people who would otherwise choose to move to (back to) the Nass Area for mine employment (especially in communities expected to serve as transportation hubs for workers to and from the mine site, e.g. Terrace); and

c) proceeds of mine generated employment, businesses, and NLG revenues re-invested in construction and development to upgrade and increase local housing stock in some or all of the Nisga'a villages.

Given the scale of net immigration in the low- and high-net scenarios, meeting increased demand over the medium to long-term is feasible. Nonetheless, in the short-term, that is until additional housing is constructed, some residences in the Nisga'a villages will continue to experience negative social impacts associated with over-crowding and inadequate accommodations that currently exist (Appendix 1).

6.2.1 Cost Implications for Nisga'a Housing in relation to Population Scenarios

Given the current housing conditions in the Nisga'a villages, it is conservatively assumed that in-migration will require new housing (see Section 6.4.1). The cost of additional housing to meet the needs of community population growth is evaluated below.

Beginning in about 2014, the migration scenarios (see Section 4.3) predict a net increase of approximately 11 (low net in-migration scenario) to 25 (high net in-migration scenario) people per year (declining gradually over time). An estimate of the annual increase in housing potentially required in the Nisga'a villages, as well as approximate costs, is shown in Tables 6.2-1 and 6.2-2 for the low net migration and high net migration scenarios, respectively. Under the low net migration

scenario, new housing costs are estimated to average approximately $550,000 per year, totalling about $13.4 million over a 25-year period (Table 6.2-1).[27] Under the high net migration scenario, new housing costs are estimated to average approximately $1.4 million per year, totalling about $34.2 million over a 25-year period (Table 6.2-2).

Table 6.2-1. Potential Housing Requirements, 2014 to 2038 (Low Net Migration Scenario)

Year	Net In-Migration	Number of Additional Housing Units	Approximate Cost of Additional Housing (M$)
2014	11	3	$0.8
2015	11	3	$0.8
2016	10	3	$0.8
2017	10	3	$0.7
2018	9	3	$0.7
2019	9	3	$0.7
2020	9	3	$0.6
2021	8	2	$0.6
2022	8	2	$0.6
2023	8	2	$0.6
2024	8	2	$0.6
2025	7	2	$0.5
2026	7	2	$0.5
2027	7	2	$0.5
2028	7	2	$0.5
2029	6	2	$0.5
2030	6	2	$0.4
2031	6	2	$0.4
2032	6	2	$0.4
2033	5	2	$0.4
2034	5	2	$0.4
2035	5	1	$0.4
2036	5	1	$0.4
2037	5	1	$0.3
2038	5	1	$0.3
Total	**183**	**54**	**$13.4**

Notes:
Number of additional housing units is estimated assuming an average household size of 3.4 for the Nisga'a villages (Statistics Canada 2007). Cost of additional housing is assumed to be approximately $250,000 per unit, based on the estimated cost to construct a typical detached single family house and lots infrastructure connection costs (Gitlaxt'aamiks Village Government, pers. comm.).

[27] Years 2014 and 2015 represent the construction phase of the Brucejack Gold Mine Project, whereas 2016 to 2037 represents the operation period of the Project.

Table 6.2-2. Potential Housing Requirements, 2014 to 2038 (High Net Migration Scenario)

Year	Net In-Migration	Number of Additional Housing Units	Approximate Cost of Additional Housing (M$)
2014	25	7	$1.9
2015	25	7	$1.8
2016	24	7	$1.8
2017	23	7	$1.7
2018	23	7	$1.7
2019	22	6	$1.6
2020	21	6	$1.6
2021	21	6	$1.5
2022	20	6	$1.5
2023	20	6	$1.5
2024	19	6	$1.4
2025	19	6	$1.4
2026	18	5	$1.3
2027	18	5	$1.3
2028	17	5	$1.3
2029	17	5	$1.2
2030	16	5	$1.2
2031	16	5	$1.2
2032	16	5	$1.1
2033	15	4	$1.1
2034	15	4	$1.1
2035	14	4	$1.1
2036	14	4	$1.0
2037	14	4	$1.0
2038	13	4	$1.0
Total	**465**	**137**	**$34.2**

Notes:
Number of additional housing units is estimated assuming an average household size of 3.4 for the Nisga'a villages (Statistics Canada 2007). Cost of additional housing is assumed to be approximately $250,000 per unit, based on the estimated cost to construct a typical detached single family house and lots infrastructure connection costs (Gitlaxt'aamiks Village Government, pers. comm.).

As discussed in more detail in Section 4.3, the high migration scenario defines a reasonable upper bound. However, the low net migration scenario and even no net migration is a possible result. If individuals decide to relocate from outside the region, it is likely that they would move to urban settings such as Terrace or Smithers primarily because there are no significant residential location advantages for working on the Brucejack Gold Mine Project and individuals may perceive the community services and infrastructure offered in larger centres desirable; thus, it is possible that there will be no cumulative housing requirements in the Nisga'a villages because of a lack of net in-migration.

Baseline research indicates there is some support available to Nisga'a citizens for the development of new housing within the Nisga'a Villages. Support includes four grants of $50,000 available to Nisga'a citizens annually (Appendix 1). At the time of writing, full-time employment was noted as the main barrier faced by Nisga'a intending to obtain a mortgage. While the development of the Project is expected to result in some pressure on housing as a result of in-migration, there are corresponding benefits associated with employment. Specifically, those who become employed with the Project may choose to build a new home, freeing up existing housing for others and contributing to the overall housing stock within the villages.

Further, for Nisga'a, the real benefits of home ownership extend beyond those typically realized by new home owners in that the ability to own property on Nisga'a Land enables home owners to obtain a loan, using the land as collateral. The change in land title is relevant to the development of the Project in two ways: first, as noted above, the Project has the potential to contribute to local employment, reducing the most common barrier to obtaining a mortgage for those who are successful; and second, for individuals able to gain Project employment and secure a mortgage for a house, the Project may spur indirect and induced economic effects resulting in further economic development within the Nisga'a villages (e.g., businesses able to provide services to the Project or businesses that service individuals with increased income as a result of the Project).

In sum, the development of the Project is expected to result in some level of increased pressure on the current housing stock in the Nisga'a villages. The extent of pre-existing housing challenges (e.g., overcrowding, need for repair) is noted in baseline research. This effect is not expected to materialize during Project construction. Rather, this would likely be experienced following the first few years of Project operation, or once a notable number of people have relocated to the Nisga'a villages for Project employment. The addition of employed Nisga'a and others in the villages may result in other positive contributions to community life, as identified by focus group participants (Rescan 2012b). While there are a number of methods through which new housing is currently developed, the potential for adverse social effects as result of further overcrowding is acknowledged.

6.3 COMMUNITY INFRASTRUCTURE – GITLAXT'AAMIKS WATER AND SEWAGE

Each of the Nisga'a villages is serviced with sewer, water, electrical, road and communications infrastructure that have the capacity to handle additional demand. Even at relatively high levels of net in-migration, most elements of community infrastructure, especially electricity and communications, have the capacity to absorb additional demand. In general, the Nisga'a villages have ample water supply and good systems that would not be adversely affected by the influx of a few families as suggested even in the high net in-migration scenario. Sewage treatment varies between the four Nisga'a Villages and while published information is not readily available, anecdotally reports are that existing facilities would be able to accommodate more demand.

Recreation facilities were discussed at some length in one of the focus groups that identified this as an area of community infrastructure that would require improvements and upgrades to accommodate more people. Focus group participants, especially youth, saw mine related socio-economic growth as an opportunity to generate interest and fund events and activities at recreation facilities. They also saw such facilities as an important dimension of attracting people to move, or return, to the Nisga'a villages and, importantly, to entice those who may be contemplating an exit to remain.

According to information received in the group interview held with Gitlaxt'aamiks Village Government councillors and senior staff January 22, 2014, the water and sewage systems of that community are approaching capacity (Gitlaxt'aamiks Village Government, pers. comm.). Baseline research indicates the currently used water system is being used to its capacity and has needed upgrades for a number of years. Notably, the system has been taxed to a greater extent over the past decade as a result of new buildings that have been constructed (e.g., the NLG office building, the recreation centre, the arts and cultural centre, the new RCMP and Fisheries offices among others). Village government staff indicated upgrades to the water system would be required to facilitate an increase in the number of people and homes in the community (Gitlaxt'aamiks Village Government, pers. comm.).

As a result of changes to land title associated with the NFA, property may now be held in fee simple and can be purchased and sold by individuals. In preparation for this change, the Nisga'a villages have established future community plans that indicate which land will be available for this purpose. Although the villages are at different stages in this preparation, some have cleared, accessible lots, while others have established cleared, serviced (water, sewer, electricity), and accessible lots.

Work to upgrade and establish public services in the villages is being addressed as needed. Further, should in-migration associated with the Project or other projects create additional pressure on water, sewage, and other community infrastructure, citizens who return are those who have obtained or might reasonably obtain employment with the Project and as such are best able to take advantage of housing and public service preparations undertaken by village governments and NLG. Should in-migration be concentrated within Gitlaxt'aamiks, additional water and sewer capacity may be required.

6.4 COMMUNITY SERVICES

The availability of social services (broadly defined to include medical, health, emergency response, seniors' care, childcare, education, training and skills development, and various forms of counselling and domestic support) varies between the Nisga'a villages. Facilities and available services are summarised in Appendix 1. Anticipated Project interactions would arise mainly from increased demand related to population increase or, in some cases, increased social issues linked to project-related employment and income. The size, duration, and location all imply that there is a very low likelihood of Brucejack Gold Mine Project specific impacts. Cumulative effects from increased resource development in the region in general are much more likely and are considered in Section 6.7.

Mine related migration of Nisga'a citizens (or others) living outside of Nisga'a Lands moving to (or back to) the Nisga'a villages will place some additional demand on local facilities and services. Increased pressure on local services may also arise should social issues such as substance abuse, domestic problems, or crime worsen or emerge in relation to mine-related employment, incomes, and work schedules (Gibson and Klinck 2005). Such a situation would likely put an additional strain on local police services and likely on medical/ambulatory services as well.

On the other hand, additional income would also enable more frequent travel to Terrace to receive certain services. According to anecdotal evidence provided in the focus groups, there is a growing

trend among Nisga'a citizens of going to Terrace for some health care and other services, in part because they are perceived to be superior to that which is available in the Nisga'a villages at this time. In the longer term, enhanced local services could be an outcome for Nisga'a if they are effectively managed to take advantage of economic opportunities and development that may be realized from mine-related employment and income.

The assessment of the potential impact of the Project on medical, education, emergency, and social services is based on the Project's influence on:

- changes in demand from a growing population;
- health risks related to environmental change or the possibility of accidents; and/or
- the emergence or worsening of undesirable social outcomes.

A summary of the availability and adequacy of existing facilities and current levels of service being provided to each community derived from desk-based research and follow up communications with Nisga'a representatives is provided in Appendix 1.

The estimated scale and likelihood of increased pressure on social services is considered in the context of the moderate net and high net in-migration scenarios described in Section 4.2. Under the assumptions of these scenarios it is projected that there will be a net change in population in the Nisga'a villages/Nisga'a Lands of approximately nine to 25 people per year during the early years of construction and that this number declines gradually over time.

6.4.1 Effects on Education Facilities and Services

The Project may impact education services either through effects on delivery and access (i.e., effects on availability of and level of service provided by teachers and administration) and/or on facilities (i.e., availability and capacity of classrooms, equipment, and supplies). Impacts may arise simply from changes in the numbers of students; that is, more students would place greater demands on the system. Impacts on education might also arise from changes in student behaviour, such as the emergence or worsening of social problems in the home or in the community, which might affect young people and spill over into the school environment.

School District No. 92 is a unique public school system that is affiliated with both NLG and BC Ministry of Education. Community schools strongly reflect Nisga'a culture as almost all students and the majority of professional and paraprofessional staff are Nisga'a or First Nations. Educational attainment levels in the Nisga'a villages is generally well below provincial averages, in some cases substantially below (Brulot 2012; SD 92 2013). Absenteeism and behaviour issues at the high school level were among several problem areas identified during a community consultation process carried out to inform the restructuring of SD 92 that came into effect in September 2012. The aim of reorganization was to make better use of resources in the context of declining enrolment and to reduce the number of multi-age (split level) classes in an effort to improve student achievement and literacy, increase attendance and manage some of the behavioural issues identified in the community consultation process.

The number of students in SD 92 dropped more than 20% between 2008/2009 and 2012/13 (MoEd 2013) and class sizes in Nisga'a schools remain well below provincial averages. Class size is one of many factors that determine education outcomes; however, in the Nisga'a case there does not appear to be a correlation between class sizes and educational attainment because classes are already quite small (Bascia 2010). Project related population increase, which is expected to include a negligible to modest increase in the number of students in SD 92, is not likely to have an adverse effect on education services or facilities as there is sufficient capacity to absorb an increase in the student population. Moreover, given that student population size is a factor in the way in that BC Ministry of Education calculates school district funding to student population, an increase in the number of students can benefit the Nisga'a education system in the longer term.

Low and decreasing levels of student enrollment over a number of years resulted in decreased levels of education funding, underperformance, and the need for substantial restructuring of SD 92. Baseline studies indicate that SD 92 developed an approach to restructuring based on three pillars: literacy, numeracy, and comprehension (Brulot, P., pers. comm.). Should the Project result in an increase to the student body of schools within the Nisga'a villages (i.e., as a result of in-migration), the corresponding increase to education funding is expected to result in positive effects for the school division. The quality and availability of education services are not expected to change as a result of the development of the Project. Nisga'a education services might be affected by other Project-related impacts linked to social problems and domestic issues that may arise in the context of work related schedules (i.e., mine shift work) and the infusion of high incomes. The relevance here in the context of education services is linked to the potential for problems in the home to spill over into the classroom, potentially worsening documented, pre-existing school issues including high rates of absenteeism, behavioural issues among high-school age students, and persistently low educational achievement (Brulot 2012; SD 92 2013). The potential for work schedules and domestic issues to affect student performance is thought to be minimal but is acknowledged.

The Project may also impact education services within the Nisga'a villages through the influence of its contribution to local employment opportunities in terms of the focus of education and type of training programs available. Typically, local resource development generates employment in specific occupations. In an effort to be prepared for and take advantage of these opportunities, education organizations in Terrace, Smithers, the Hazeltons, and elsewhere have developed targeted training strategies. Baseline research indicates that Nisga'a Valley SD 92 is no exception and has planned, as part of current restructuring efforts, to implement a trades options programs as part of high school curriculum (Brulot, P., pers. comm.).

Finally, focus group participants pointed out that, based on previous experience, some young people might be induced to leave high school early to pursue comparatively higher paying employment in the mining sector. While this may have been an attractive alternative to finishing school in the past, in today's mining industry high school graduation (or equivalent) is often the minimum requirement for entry-level positions. The modern mining industry is increasingly complex and technology driven and the need for unskilled labour is in decline. Rather, the development of the Project and the skill requirements of Project employment may serve to diversify the type of education and training programs available to Nisga'a.

In sum, the Project is expected to contribute somewhat to changes to the delivery of education and the performance of students. A number of other variables (including for example, education funding, the restructuring effort, and parental expectations), are expected to play a greater role in the educational outcome of Nisga'a students. Notably, it is expected to be less likely for individuals with families to choose to relocate to the Nass Area to obtain mine employment as a result of the limited availability of housing. As such, the potential for increases to the student body in the Nisga'a villages is also limited.

6.4.2 Effects on Emergency, Health, and Social Services

Emergency, health, and social services and infrastructure in the Nisga'a communities are similar to those of other BC communities located in relatively remote, rural settings. Facilities are typically modest with basic levels of equipment and supplies and while there are professional staff members, there is also a relatively high dependence on volunteers. Most local, Nisga'a emergency, health, and social services operate at or near capacity which leaves them vulnerable to relatively small increases in demand, for example, from having to serve a larger population or an increase in social problems (Gitlaxt'aamiks Village Government pers. comm.).

Research has shown that mine-related employment and incomes are sometimes linked to increased incidents of alcohol and drug abuse in communities (Gibson and Klinck 2005), a point raised on numerous occasions in the focus groups (Rescan 2012b). In fact, some focus groups participants went so far as to draw a direct correlation between mine employment and the need for more police in the Nisga'a communities (Rescan 2012b, 2012a). It is likely there will be some effect on emergency, health, and social services that arise in more or less direct relation to the amount of people and disposable income that eventually flows into Nisga'a villages. Increased demand on emergency services (e.g., paramedic services) may result should a number of people choose to relocate to the Nisga'a villages to obtain Project employment or employment with the other projects. However, given the relative levels of predicted increase (i.e., from a low of approximately 11 to a high of 25 additional people annually), there is limited potential for impacts to emergency services. Baseline research indicates each community has some level of access to emergency services (Appendix 1). Should the development of the Project and other resource development projects result in in-migration to the Nisga'a villages, it is anticipated that the current level of emergency services could accommodate newcomers to an extent. That is, the annual addition of a relatively small number of people is not expected to have an effect until perhaps year five or ten, when the total number of newcomers begins to add up to a larger total. The addition of a number of employed individuals into the community would contribute, to some extent, to an increased demand for emergency services. However, the incremental effect of the Brucejack Gold Mine Project is predicted to be negligible, with the largest impact being associated with cumulative effects under a high in-migration scenario.

Similarly, in-migration may result in some increased demand for health services. The demand is expected to be placed on both the Nisga'a health centers and health services in Terrace, and would be dependent on levels of in-migration. Increased demand on social services is expected to be situational and is based, to an extent, on the personal decisions and the behaviours of individuals who choose to relocate for employment. As noted earlier, increased income has the potential to

contribute to both positive and negative social behaviours. Overall, increased demand on emergency, health, and social services may strain the capacity of these services to contend with potential increases in public and domestic disturbances.

Mine-related traffic accidents along Highway 37/37A are another potential source of increased demand on Nisga'a emergency services. In the unlikely event that emergency services located in Gitlaxt'aamiks were the closest available to an accident, Nisga'a emergency services could be called upon for response. Such additional demand is expected to be very short term and is unlikely to create a noticeable burden on Nisga'a emergency services capacity.

In sum, the Project is expected to result in some in-migration, which reasonably translates to some level of increased demand on community services, should those who have relocated choose to access services in the Nisga'a villages. Effects to community services are not expected during the construction phase or initial few years of Project operation. Rather, there is potential for the development of a cumulative impact to community services within approximately five or ten years, when the predicted number of people that migrate to the villages reaches a more substantial number.[28]

6.5 COMMUNITY WELL-BEING

Notwithstanding the socio-economic benefits of mining projects through the provision of employment and income, the emergence or worsening of social problems is also a possible and well-documented effect of mine development on the small, mainly Aboriginal communities in rural and northern regions of Canada (Gibson and Klinck 2005). This section considers issues related to various social changes and impacts that may arise in relation to the Brucejack Gold Mine Project and mine development more generally that could exacerbate pre-existing social problems or, in rare instances, lead to the emergence of new challenges for individuals, families, or the community at large.

Assessment of the Project's potential impact on community well-being is informed by review of several studies and reports that examined the experiences of Aboriginal communities with mining and other comparable resource development projects in Canada and British Columbia (Appendix 2). The SERC Survey data and insight from focus group interviews provide additional context and understanding of local perceptions of the potential impact of mining.[29]

---

[28] Under the medium growth scenario, the development of the Project and all other projects has the potential to result in an estimated 45 additional people over five years, or potentially 11 additional people per community. Under the high growth scenario, the development of the Project and all other projects has the potential to result in 225 additional people over five years, or approximately 55 additional people per community.

[29] As noted in Table 3.1-1 the ESCIA Guidelines identify NLG's concern with the impact of the Project on, "crime and family and community well-being." Conceptually, "well-being" is a useful term meant to characterize a more holistic definition of health that includes many facets of individual, family, and community conditions. However, without clear definition it is too vague for the purposes of meaningful social impact assessment. In the interest of clarity the valued component "social problems" was defined. The valued component Social Problems, identified in Table 3.1-1, captures the multitude of potential social issues, risks, and concerns highlighted in the ESCIA Guidelines under "crime and community health and wellbeing." See Appendix 1 for a discussion of the social setting of Nisga'a villages based on range of social indicators variously used to inform understandings about community health and wellbeing on Nisga'a Lands.

The key intermediate social effects of the Project – migration and population change, increases in disposable income, and changes to patterns of work – may impact social conditions or behaviours such as increased substance abuse, gambling, domestic issues, and crime. Positive outcomes may also arise from increased family and community resources, services, and facilities that are realized in part through the socio-economic benefits of mine-related incomes, revenues and investment. The social behaviours (both positive and negative) that result in response to population change and changes to income and patterns of work are difficult to predict, as these are determined by individual choice. The impacts of these intermediate effects on social problems are discussed separately below, although in practice they are obviously interdependent.

6.5.1 Migration and Changes in Local Population

Research and experience from other jurisdictions suggest that the influx of workers associated with mining and other large resource development projects can influence changes in individual behaviour, social conditions, and community dynamics in small, remote communities and lead to an increase in social issues. The National Aboriginal Health Organization (NAHO) reported on the impacts of resource extraction projects in northern and Aboriginal communities, citing in particular the impacts of a predominantly male and transient worker population usually with limited knowledge or understanding of Aboriginal culture and values. Such an influx of outsiders increases the load on community services (e.g., health, social, and emergency) and infrastructure (e.g., sewer, water, and housing). In other jurisdictions it has been tied specific effects such as higher rates of sexually transmitted diseases and to more general destabilizing impacts on local social values and culture (NAHO 2008) .

It is unlikely that Nisga'a villages will experience this sort of migration impact to any substantial degree. The highest projections provided by the population migration model suggest an increase of about 22 to 25 per year in the early years, declining over time to about 13 to 14 towards the end of Project life (see Section 4.2). This level of population change is nowhere near the scale of influx referred to in the NAHO (2008) study. Further, the strongest motivators for individuals to return to the Nass Valley included cultural and family ties (SERC Survey), that is, personal ties to the communities. Whereas, impacts associated with the in-migration of transient workers are typically characterized most strongly by a lack of attachment or connection to community.

In addition to the scale of migration, the impact of population increase also depends on how quickly and easily new migrants become integrated within the community. It is assumed that most, if not all, migrants will themselves be Nisga'a citizens. As such, pre-existing relationships and family connections that facilitate integration and improve feelings of connectedness for both residents and newcomers are anticipated. In this way, Nisga'a villages would seem to be insulated, in the short- to medium-term at least, from the potential impacts of a large influx of newcomers as might be associated with other large resource development projects. While the "strangers" problem may not be a major challenge for the Nisga'a villages, local residents noted in the focus groups that even a relatively small increase of five families would be difficult for some of the villages to absorb due to pre-existing problems of over-crowding and the general lack of available housing. Strangers or not, there may be adverse effects in the beginning as residents and newcomers alike get to know each other. Ultimately, it is not the numbers of people that may arrive, but what they do and how current

residents respond, that will have the greatest effect on whether or not changes to the local population lead to the emergence or worsening of social problems. Specifically, should individuals who relocate to the Nisga'a villages for Project employment choose to participate in negative social behaviours (e.g., drinking, drug use), other negative outcomes are anticipated. Alternatively, should individuals who related the Nisga'a villages for Project employment choose to participate in positive social behaviours (e.g., attending to family and community, participating in cultural activities) additional positive outcomes will likely follow.

As noted in Section 4.2, projecting the population effects of closure and post-closure stages of the Project's life is not possible as it is difficult to predict what other social and economic developments will take place in the region over the next two plus decades. In short, if the Project simply comes to an end and there are no other opportunities for Nisga'a citizens living in the Nass Area, then it is likely that there could be adverse effects on community well-being as a result of the discontinuation of employment and income. Adverse effects would be associated with the loss of jobs and income and potential depopulation, rather than the challenges of accommodating and embracing an influx of newcomers described above. However, this outcome is believed to be unlikely given the low level of in-migration expected during construction and operation of the Project, and the potential for there to be other development in the region to offset the changes due to the Brucejack Gold Mine Project during closure and post-closure.

6.5.2 Increases in Disposable Income

Wages in the mining industry, compared to other sectors of the economy, are relatively high. In addition to direct mining employment, incomes may also increase for community members that secure indirect and/or induced employment due to economic activity and opportunities that arise in response to mining activity. While increased income can lead to improved standards of living or quality of life (NAHO 2008), Aboriginal communities in particular, which often already face social issues such as substance abuse, crime or family dysfunction, may be especially vulnerable to the potential negative effects of increased income.

Past research has shown the increased disposable income associated with resource development projects often results in increased alcohol consumption and substance abuse problems, which in turn are linked to child neglect, family and community violence, and other social problems (Brockman and Argue 1995; Archibald and Crnkovich 1999; Brubacher & Associates 2002; Labrador West Status of Women Council and Femmes Francophone de l'Ouest du Labrador 2004; NAHO 2008; CCSG Associates 2004). In the case of young, single male workers, the combination of a lack of financial experience and responsibility to support a family, this dynamic may be exacerbated. In an examination of mining and the impacts of increased income, Brockman and Argue (1995) found that substance abuse is linked to death through suicide, overdoses, or alcohol-related accidents. In a 1998 women's workshop the potential impacts of the Voisey Bay Nickel Project were discussed and women identified increased income and related alcohol and drug use as one of their main concerns (Archibald and Crnkovich 1999). Youth are especially vulnerable to the temptation of substance abuse enabled by higher incomes (NAHO 2008) which not only impacts those directly involved, such as spouses and siblings, but typically has broader, adverse effects on the community at large (Gibson and Klinck 2005; Phipps and Lethbridge 2006).

In focus groups with Nisga'a Elders, it was noted that drugs and alcohol and other influences related to increased incomes, can be very destructive: "…people should be protected and monitored with regards to mines [i.e., in the camps and communities] not just the environment" (Rescan 2012b, 2012a). Similar views about social risks of mine employment are identified in a report focused on mining experiences and the Tahltan Nation:

> *Tahltan leaders have expressed concern that large disposable incomes from mining may be a significant contributor to drug and alcohol problems. This concern is part of a larger issue of effectively managing a community and culture in transition – in a way that maintains the best of past practices while taking on the best of new ways* (IISD and Tahltan First Nation 2003).

Positive outcomes related to increased household incomes include enhanced capacity to invest in housing improvements, ownership, or expansion, pursuit of training or higher education, or wealth accumulation and saving for the future tend to not only benefit individual households but to also provide social and health benefits for the community at large. For example, housing improvements may help reduce the spread of viral and bacterial infections and improve poor performance at school, both of which have been associated with overcrowded housing (Jackson and Roberts 2001). Participants in the Nisga'a focus groups also discussed the benefits of increased household income. They spoke in particular of enhanced self-esteem and the opportunity to provide a better life for their children. For some, the prospect of relatively high income offsets the negative aspect of mine related shift work (Rescan 2012b, 2012a). For others, shift work is preferred as it enables extended periods of time off to participate in land use and other cultural activities. These sorts of positive outcomes and associated improvements in individual and community health and well-being have been documented in other projects and jurisdictions as well (Phipps and Lethbridge 2006).

Finally, evidence suggests that higher incomes related to mining can lead to greater income disparity, which can have an unsettling effect in societies characterized by norms of reciprocity and sharing (InterGroup 2005; NAHO 2008). In small, tightly knit communities, such as the Nisga'a villages, this could lead to friction between different groups and/or individuals in the community and, in some case, migration away from the community (InterGroup 2005; NAHO 2008). Participants in the Nisga'a focus groups, however, did not anticipate social problems or issues related to greater potential income disparity. Rather, the predominant view was that project-related employment opportunities were a means to increase economic diversification and create new types of higher paying jobs in the community. Elders, in particular, emphasized the importance of reducing unemployment and the commensurate social benefits of meaningful occupation of people's time, including increased self-esteem and improved financial capacity to participate in cultural activities. But as the SERC Survey indicates, Nisga'a are well aware that these benefits will only materialize for the Nisga'a if they are indeed able to secure employment on a meaningful scale in line with the number of Nisga'a citizens who are willing and able to work for the projects. The impact of higher incomes on social problems that is realized is uncertain and likely to at least partially be offset by improvements in social conditions and health. Finally, counselling and other social programs aimed to assist those who struggle with addiction or domestic challenges are available in the Nisga'a villages and represent one aspect of support for those who transition to project employment.

6.5.3 Work Schedules

As with most contemporary mining projects in northwest BC, which tend to be remote from established settlements, current practice is to build well-appointed camps and operate on a fly-in/ fly-out basis rather than establish a town to house mine employees and their families (Kuyek and Coumans 2003). Work schedules typically involve shift rotations of two to four weeks at the mine and a comparable time off. The resultant separation of workers from their families and home communities for weeks at a time puts a strain on family and community relationships, which can contribute to a worsening of social problems (NAHO 2008). For many the negative effect of extended absence is offset by the time at home and it is possible that after an initial period of adjustment, the adverse social and well-being effects should decrease although this is not well documented.

A recent literature review by InterGroup (2005) examined the effects of fly-in/fly-out work schedules on family and community dynamics in northern Saskatchewan communities including effects on children, relationships, and members of the extended family. Household level effects included: the strain of independent decision making and an increased workload on the (usually female) spouse who remained at home; increased level of concern and worry for the absent family member; and increased spending as a result of the increased household income on transportation, home improvement, entertainment, and clothing, among others (InterGroup 2005).

The Nisga'a focus groups revealed similar concerns, pointing in particular to the case of families and the additional demands of single parenting that fall to the stay-at-home partner (Rescan 2012b, 2012a). Gibson and Klinck (2005) examined the impacts of mines on communities in the NWT including the problems associated with loss or fragmentation of family time and noted the linkages between the extended absences of a parent (often the father), behavioural issues in children, and in some cases increased incidents of domestic violence.

According to InterGroup (2005), effects on children are linked to both the family's stage in the life cycle and place within the community, but are driven mostly by difficulties associated with adjusting to a parent's absence. Effects on relationships, according to this study, include increased rates of family violence and break-ups and increased strain on the relationships between families and partners. Impacts on family members can have far reaching effects especially in Aboriginal communities where extended families are large and a prominent feature.

The Nisga'a focus group interviews highlighted that the structure of Aboriginal families, notably the extended network of individuals within the family unit, provide additional support for those coping with the absence of a family member. The Nisga'a focus groups identified strong familial ties throughout the Nisga'a villages as an important feature of Nisga'a culture. There was a strong indication from the focus group participants that extended families provide a built in social safety net that helps support families which might be dealing with the challenges of one or perhaps even both, parents working at the Project.

Other effects on family dynamics noted in the InterGroup (2005) study included increased rates of substance abuse and loneliness associated with separation from family. Substance abuse was also among the items of high concern for Nisga'a focus group participants, especially the women's groups most of which also indicated that they would prefer the camps be free from alcohol (Rescan 2012b, 2012a).

Overall, the Nisga'a focus groups revealed perspectives that differ from the InterGroup (2005) study with respect to the effects of fly-in/fly-out work schedules associated with mining work.[30] Perspectives were also differentiated between communities, between men and women, and between Nisga'a citizens living in the Nass versus those living in more urban settings (i.e., Terrace, Prince Rupert, and Vancouver). Some people were familiar with shift work and mining work generally and thought although adjustment would be required, families would make it work. Others did not favour the idea of their spouse spending that much time away from home. Youth tended to favour extended time periods outside the community, but did not indicate familiarity with mining or mining work. One of the women's focus group stated that employment would have a positive impact at the local level, and that if shift work was required to obtain employment they would accept that challenge. One woman commented: "it would be up to us women to set a good example and be good role models for the next generation." This group thought the opportunity to have a second income, or a single income for some families, along with the potential population increase, far outweighed any negative impacts associated with shiftwork (Rescan 2012b, 2012a). Overall, those most interested in mining employment, both men and women, stated if the employment available included fly-in/fly-out shift work, families would see this as an opportunity and that they would adjust and adapt to work schedules as necessary (Rescan 2012b, 2012a).

In sum, the development of the Project is expected to have an impact on community well-being. The extent of the effect will be determined by the number of Nisga'a that obtain employment with the Project and the number of people that choose to re-locate to the Nisga'a villages for the same reason. Even then, should many Nisga'a obtain Project employment and higher levels of in-migration are realized, changes to family and community well-being will be based on how individuals respond to increased incomes and Project work rotation schedules. In many respects, positive outcomes as a result of increased income and employment are just as likely, if not more so, than negative outcomes.

6.6 NISGA'A WORKER HEALTH

The ESCIA Guidelines identify specific concerns about potential Project related risks to the health and physical well-being of Nisga'a citizens who obtain direct or indirect employment with the Project. This section includes assessment of both occupational and non-occupational health and accident risks that may arise from Project-related activities. Specific issues that are considered include health risks associated with anticipated air and water impacts of the Project and accident risks associated with transport and other occupational activities.

6.6.1 Health Risks

Potential negative health effects of the Project are expected to be localized to the mine site. The only Nisga'a citizens that might be exposed to any effects that arise will be those Nisga'a who find employment with the Project. Nisga'a are not known to actively use the back country in the vicinity

[30] Note that the Nisga'a focus groups deal primarily with perceptions and opinions about possible future outcomes whereas the InterGroup (2005) study is an analysis of past events.

of mine area likely because of its remote location from Nisga'a villages and the potential availability of other more accessible areas closer to the villages that would be favoured by most Nisga'a harvesters and hunters.

The Brucejack Gold Mine Project Application/EIS presents an analysis of the potential environmental health hazards related to Project effects on noise, air quality, surface water quality, country foods, and drinking water quality. In general, the analyses find that there is likely to be little in the way of negative occupational and/or non-occupational impacts with respect to the above components. Activities are being designed and planned so that emissions and exposures fall within the relevant provincial or federal guidelines.

Nevertheless, there is a perception among some Nisga'a that mine development may bring unwanted health effects linked to mine related pollution and/or contamination of air and water. Recent community research identified concerns related to mine projects in general. For example, there is a concern that mine exploration and projects located north of Stewart may impact water conditions in Bowser Lake (which drains into the Bell-Irving and later the Nass River) creating the potential for impacts to the drinking water and salmon stocks on which Nisga'a depend (Nisga'a ESICA Fieldtrip 2014). The Brucejack Gold Mine Project Application/EIS includes two points that address this concern: (1) the Project is not anticipated to have an effect on downstream water quality or fish habitat; and (2) all water used by the Project will be treated before return to the watershed, which drains into the Unuk River to the west.

Additionally, respondents to the SERC Survey and in the focus groups expressed a range of perspectives on the perceived linkages between mine related environmental and health effects. For example, in two of the focus groups there was considerable discussion of the possible linkages between water pollution and cancer. The source of this concern originates from perceptions among many Nisga'a citizens that remember the negative environmental impacts of the original Kitsault mine, especially with respect to fish and seafood (Rescan 2012b, 2012a).

Approximately 12% of SERC Survey respondents stated that concerns about mine-related environmental hazards and pollution would be a factor in their decision about whether or not to stay on Nisga'a Lands. While this suggests some level of concern within the community about health effects linked to mine activities, it does not represent a large proportion of the population. Such concern is likely to be much lower with respect to the Brucejack Gold Mine Project given its remoteness from the Nisga'a villages. The actual level of health risks related to the mine construction and operations on Nisga'a citizens will be negligible and, once again, would only have direct implications for those working at the mine itself.

6.6.2 Accident Risks

There are hazardous occupations and activities involved in large-scale construction projects and mining operations. The potential risk of injury and/or death resulting from job site accidents based on aggregated historic WorkSafeBC statistics suggest the potential for 35 injuries per year during the construction phase and six per year during the operation phase. During the closure and post-closure phases of the Project there is a statistical expectation that 0.1 injuries per year will occur (WorkSafeBC 2012). These statistics are based on very broad WorkSafeBC industry categories that include mining

along with other primary industries such as logging. The WorkSafe estimate is almost certainly an overstatement of the level of accident risk that can be expected at the mine site given that it is lumped in with logging industry statistics, which historically has more hazardous occupations.

By comparison, the Mining Association of BC collects statistics on lost time injury across 24 active mines in BC. For 2011, the frequency of lost time injuries was 1.15 per 100 person years (MABC 2014a). In other words, among 100 people working for a full year at mines in BC a little more than one injury (1.15 to be exact) was recorded that lead to a loss of work time. Most of these injuries are relatively minor and do not involve long-term impacts to workers. There is no reason to expect that Nisga'a citizens would be at any greater or lesser risk of job site injury than the general population. Given the level of employment of Nisga'a directly with the Project, this translates to a negligible number of incidences of recordable lost time injury during construction (much less than one, assuming approximately five Nisga'a directly employed by the Project; Section 5) and an average of one lost time incident approximately every 2.5 years during operation (assuming 36 Nisga'a directly employed by the Project).

Other accident risks, which fall more readily into the non-occupational accident risk category, are linked to transportation and vehicular traffic servicing the mine site. Nisga'a citizens who use Highway 37 for travel or to access harvestable plants along the roadway would be exposed to some level of accident risk from traffic, including the movement of heavy trucks and equipment, buses, and other industrial transport along Highway 37. However, the risk is low and Nisga'a are no more or less exposed than anyone else who may use the road.

While NLG identified driving hazards, explosives and wildlife as hazards of concern, these issues did not emerge in the focus groups as issues of particular concern in the context of mine development. In sum, while the Project is not anticipated to affect Nisga'a worker health, community perceptions related to the impacts of mine project on health risks (i.e., as a result of Project-related changes to noise, air quality, surface water quality, country foods, and drinking water quality) and accident risks (e.g., hazards associated with mine employment) are acknowledged. Perceptions may be related to past experiences and may be, in a sense, addressed through future experiences with mine development and the Project's commitment to adhere to high environmental and health and safety performance standards.

6.7 CUMULATIVE-INCREMENTAL EFFECTS ON NISGA'A SOCIAL CONDITIONS

The cumulative-incremental effects of the Brucejack Gold Mine Project are characterized through an examination of different development scenarios. These scenarios are described in detail in Section 2.2.4. Consideration is given to the potential effects of regional development on Nisga'a society with and without the Brucejack Gold Mine Project.

6.7.1 Scenario 1a: Low Regional Development without the Project

Scenario 1a considers project development that is either well-underway or completed. Most in-migration and changes to village populations associated with Scenario 1a have already occurred.

The key cumulative incremental effects of scenario 1a on Nisga'a social conditions are as follows:

- Increased demand for housing:
  - Minimal impact given the negligible influx of people and few people leaving to work at remote project sites.
- Increased pressure on community infrastructure (e.g., roads, water, sewer):
  - Road infrastructure could be subject to some increase in construction vehicle traffic (Highway 37). Effects to water and sewer systems are not anticipated as a result of negligible in-migration.
- Increased demand for community services (education, emergency, health, and social services):
  - Effects to community services are not expected as a result of negligible in-migration.
- Increased risk to Nisga'a worker and citizen health:
  - Overall, health and accident risks are relatively low (i.e., compared to baseline and other development scenarios) given in the negligible influx of people and few people leaving the community for project work.
  - There is minimal potential for increased accident risk on Highway 37 as a result of increased project construction traffic.
- Changes to community well-being:
  - Minimal impact due to negligible in-migration (i.e., in-migration has already occurred, additional in-migration is not expected as a result of these project as their construction phases are either completed or well-underway).
  - Consideration is given to the limited risk of transient construction crews in temporary camps near the Nisga'a villages during construction of NTL. At the time of writing, effects of this nature were not known to have materialized.

The cumulative incremental effects of the low development scenario without the Brucejack Gold Mine Project on Nisga'a social conditions are considered minimal. Notably, as of July 3, 2013 the Nisga'a workforce on NTL ranged between 30 and 55 workers and included employment for Nisga'a citizens from all four villages and neighbouring urban communities (Nass Area Enterprises Ltd. 2013). In sum, the low development scenario without the Project is characterized relatively minimal effects to Nisga'a social conditions.

6.7.2 Scenario 1b: Low Regional Development with the Project

Low regional development Scenario 1b includes consideration for the Brucejack Gold Mine Project. The predicted cumulative-incremental effects on Nisga'a social conditions are expected to be greater than Scenario 1a, but still minimal. As noted earlier, effects to Nisga'a social conditions stem from the level of in-migration and employment realized. Under this scenario, there is expected to be minimal to moderate in-migration.

The following are considered to be the key cumulative incremental effects of Scenario 1b on Nisga'a social conditions:

- Increased demand for housing:
  - Current conditions of overcrowding may be exacerbated by in-migration creating some additional strain.
- Increased pressure on community infrastructure:
  - Effects to community infrastructure are thought to be negligible to minimal. Additional consideration is given to the potential for in-migration to Gitlaxt'aamiks, as community water and sewer systems are currently operating at capacity and require upgrades.
- Increased demand for community services:
  - Despite some level of in-migration, medical, social, and emergency services remain adequate. Education services remain adequate in terms of teacher-student ratios and classroom capacity, with an increase in the student population expected to be a welcome change (e.g., additional students in Nisga'a schools correspond with increased education funding).
- Increased risk to Nisga'a worker and citizen health:
  - Overall risks are generally low given the anticipated minimal influx of people and few people leaving the community for work at remote project sites. Substantive health risks associated with the projects are not anticipated in low development scenarios.
  - There may be an increased risk of accidents on Highway 37/37A due to increased traffic. The Project would utilize Highway 37 both between the junction with Highway 16 at Kitwanga and to Terrace or Smithers. The construction periods of other projects are expected to be completed by summer 2014 and increased traffic levels are not associated with the operation of these projects. Overall, the level of increased traffic is limited and effects to Nisga'a worker and citizen health are anticipated to be low.
- Changes to community well-being:
  - Possible social impacts related to low levels of in-migration, increased incomes, and disruption of familiar patterns by shift rotations typical of mine employment. Such disruptions are a potential specific, incremental impact of the Project and would be dependent on the number of people that obtain Project employment and choose to reside in the Nisga'a villages. This effect is offset by positive outcomes related to better incomes and lower unemployment.

The cumulative-incremental effects of the low development scenario with the Brucejack Gold Mine Project on Nisga'a social conditions are considered to be minimal.

6.7.3 Scenario 2a: Medium Regional Development without the Project

The predicted cumulative-incremental effects of medium regional development without the Brucejack Gold Mine Project included inclusion of the Kitsault Mine Project and KSM Project.

With respect to anticipated demographic changes in the villages, the results of the SERC Survey suggests the prospect of mine employment does influence the decision of people to move (back) to the Nisga'a villages, although a notable number of those who relocate choose to reside in Terrace or Prince Rupert to be close to the "pick-up-point"[31] and easy transport to the KSM project site. Individuals who obtain employment with Kitsault may elect to reside in Gitlaxt'aamiks as plans indicate the Project will pick-up workers in Gitlaxt'aamiks and Terrace. Overall, the SERC Survey results suggest a moderate[32] influx of people in response to the employment and business opportunities. Should high in-migration be realized, 44 to 55 people may relocate to the Nisga'a villages within two years (2015/2016). Population increase is expected to be notable under medium development Scenario 2a. Gitlaxt'aamiks may receive a notable portion of in-migration as the community (1) was proposed as a pick-up-point for the Kitsault project, (2) is a service hub with the Nisga'a villages[33], and (3) is located nearest to Terrace, a larger regional hub that is a pick-up-point for KSM and other projects.

The following are considered to be the key cumulative incremental effects of Scenario 2a on Nisga'a social conditions:

- Increased demand for housing:
  - There is limited available housing in Nisga'a villages. Migration related to the Kitsault and KSM projects is predicted to create an additional strain on housing resources dependent on the number of people who relocate (back) to the Nass Area for employment.
- Increased pressure on community infrastructure:
  - Greater traffic volumes on Nisga'a Highway 113 are anticipated as a result of Kitsault construction traffic. Bussing workers to site from Gitlaxt'aamiks and/or Terrace is expected to require two, 50 person busses per week (Avanti 2011) and would reduce traffic on Highway 113 that would otherwise result from travel by village residents who obtain project employment. Greater traffic volumes on Highways 37/37A are predicted due to Kitsault Project and KMS construction traffic.
  - There is potential for a moderate increase in the demand on water and sewer services in Gitlaxt'aamiks dependent on the level of in-migration.
- Increased demand for community services:
  - Medical services experience additional demand but the existing capacities is adequate. There is, however, some potential for additional students in Nisga'a schools due to in-migration. A larger student body equates to additional education funding which serves to offset additional demands on the education system.

[31] A "pick-up-point" is the location at which workers meet to begin transportation either by bus or aircraft to a remote project site where they work for an extended period, typically two to four weeks, prior to returning to the "pick-up-point" at the end of shift.
[32] The SERC Survey results indicated an in-migration of 9 to 11 people are expected to relocate annually; under high in-migration, 22 to 25 people are expected to relocate annually.
[33] That is, there are additional services and service capacities available in Gitlaxt'aamiks as compared to other Nisga'a villages.

- Increased risk to Nisga'a worker and citizen health:
  - Overall, the level of health risk continues to be minimal, there is some increased level of accident risk for Nisga'a workers due to employment and for Nisga'a citizen's due to greater traffic volumes.
  - For Nisga'a workers, risk exposures are as typically associated with mine employment (e.g., injuries related to the mine setting, the physical nature of work, and transportation to and from the mines). Some additional accident risk associated with travel to and from the project sites due to the greater traffic volumes.
  - For Nisga'a citizens, increased risk for accidents (e.g., vehicle collisions, other accidents associated with greater traffic volumes) for those travelling north of Terrace.
- Changes to community well-being:
  - Risks as described in Scenario 1a are increased moderately. While employment is desirable, adverse social outcomes with increased incomes and shift work that may materialize for some. These well-documented adverse effects are likely most relevant for those who have previously struggled with substance and other issues related to family dysfunction.

The cumulative-incremental effects of Scenario 2a medium development without the Brucejack Gold Mine Project on Nisga'a social conditions are somewhat higher in comparison to the low development scenarios. Overall, effects are considered moderate and are expect to accrue over a period of time corresponding to the overall increase in population with ongoing in-migration.

6.7.4 Scenario 2b: Medium Regional Development with the Project

Medium regional development Scenario 2b includes consideration for the Brucejack Gold Mine Project. The combined effects in this scenario imply higher cumulative effects for two reasons: first, there is a high likelihood that Nisga'a citizens will obtain employment with each of these projects, and second, as a result, it is predicted that a number[34] of people may choose to move (back) to the Nisga'a villages (see Section 4.2.2 for further discussion of potential migration scenarios).

The following are the key cumulative incremental effects of Scenario 2b on Nisga'a social conditions:

- Increased demand for housing:
  - Housing capacity is reached as a result of in-migration. Housing grants are available to supplement the cost of four new houses annually; potentially providing housing for approximately 20 individuals. Alternatively, new housing may be established by current residents, resulting in availability of pre-existing housing for use by newcomers.

[34] The SERC survey results indicated that in-migration to Nisga'a villages may be moderate, representing a range of 9 to 11 people annually to high, within a range of 22-25 people annually.

- Increased pressure on community infrastructure:
  - Increased demand for water and sewer services is expected and corresponds with levels of in-migration. Overall, demand is not anticipated to exceed available capacities. Gitlaxt'aamiks is the exception, as the water and sewer systems are currently at capacity and require updates. Should a substantial number of Nisga'a workers elect to relocate to Gitlaxt'aamiks, strain on water and sewer services is expected.
  - Increased demand on Nisga'a road infrastructure (namely Nisga'a Highway 113), beyond that described in Scenario 2a is not anticipated to result from the inclusion of the Project. Greater traffic volumes on Highways 37 and 37A because of the Project will increase use, but expected to remain well within capacity.
- Increased demand for community services:
  - Elevated demand for medical services. Services in Terrace are also expected to be utilized to a greater extent but have the capacity to absorb increased demand. With an increase in local population, emergency services (e.g., ambulance, fire) will likely need to be re-evaluated to determine whether or not there is adequate capability to meet demand. Social services are predicted to be able to cope with elevated demand (e.g., for counselling services, mental health, substance abuse, and domestic violence).
- Increased risks to Nisga'a worker and citizen health:
  - Overall, risks are relatively low but trend upwards due to in-migration and effects are more pronounced.
  - For Nisga'a workers, typical accident risks associated with mine employment. Consideration for more individuals to be affected as more Nisga'a gain employment; typical mine health risks are anticipated related to the mine setting, physical nature of work, and transport to/from the mine.
  - For Nisga'a citizens, no increase to the potential for adverse health effects is predicted, with the exception of a moderate increase in accident risk due to traffic volumes on Highway 37/37A.
- Changes to community well-being:
  - Potential for increased social risks and benefits as in-migration and the number of Nisga'a employed by the projects increase. The nature of the effect does not change; although effects may be experienced by larger segments of the population, resulting in more pronounced effects overall. As noted earlier, the potential for adverse effects associated with increased incomes and shift work may or not may be realized as it is dependent on individual choices and behaviours, and is typically related to a pre-existing condition.
  - Potential for increased levels of substance abuse and related domestic issues as the number of project employees increases and employees with newly acquired, higher than average income seek to establish a healthy work/life balance.
  - There is some potential for increased levels of crime in the Nisga'a villages as income disparities are now more prominent.

The cumulative-incremental effects of Scenario 2b medium development with the Brucejack Gold Mine Project on Nisga'a social conditions are moderately higher as compared to the medium development scenario without the Project. Overall, cumulative-incremental effects are considered moderate, are expected to require a period of time to accrue (related to population change over time), and are dependent on the rate of in-migration to the villages.

6.7.5 Scenario 3a: High Regional Development without the Project

The high development scenario includes two additional mining projects taking place in the general region of northwest BC; however, these projects are located well outside the Nass Area. The combined effects of projects considered within Scenario 3a imply a higher level of cumulative effects as compared to medium development Scenario 2a. But given the location and timing of the Galore Creek and Schaft Creek projects, the difference as they may are expected to affect the Nisga'a are predicted to be marginal. SERC Survey results suggest that Nisga'a and others residing outside the Nass Area are less likely to relocate for employment with Scenario 3 projects, given their remote locations from the villages. As a result, influx to Nisga'a communities as a result of these additional projects, compared to Scenario 2a, is expected to be low to negligible, meaning in-migration to Nisga'a villages is expected to be similar to levels described in Scenario 2a. Scenario 3a, high regional development without the Brucejack Gold Mine Project, is expected to produce the following key cumulative-incremental effects on Nisga'a social conditions:

- Increase demand for housing:
  - Few additional people/families are drawn (back) to the Nisga'a villages as a result of Scenario 3a projects. Housing demands are similar to those described in medium development Scenario 2a.
- Increase pressure on community infrastructure:
  - Pressure on water and sewer services is similar to medium development Scenario 2a. No increased strain on water/ sewer services at Gitlaxt'aamiks is anticipated.
  - Highway 37 and 37A experience greater traffic volumes and pressure on road infrastructure during the construction of Scenario 3a projects.
- Increased demand for community services:
  - Similarly, notable increased demand for health, social and community services over Scenario 2a is not anticipated. There is some potential for increased demand on social services as a result of increased incomes and potential undesirable outcomes (e.g., substance abuse).
- Increased risks to Nisga'a worker and citizen health:
  - In addition to risks described in Scenarios 2b, cumulative-incremental effects for Nisga'a workers travelling on Highway 37 and 37A include increase risks for accidents. Additional work accidents are not expected as notable levels of additional employment for Nisga'a village residents is not anticipated in Scenario 3a.Personal risks arise in relation to remote mine sites and transportation to those sites via road or plane. No additional health effects are anticipated.

- Changes to community well-being:
  - Additional challenges to community well-being compared to Scenario 2a are not anticipated. As noted earlier, the potential for adverse effects associated with increased incomes and worker rotation schedules may or not may be realized. Potential for increased crime levels in the Nisga'a villages at this time as income disparities are more prevalent.

6.7.6 Scenario 3b: High Regional Development with the Project

The addition of the Brucejack Gold Mine Project to high regional development Scenario 3b is expected to result in effects to Nisga'a social conditions more pronounced as compared to Scenario 3a due to the Project's location in proximity in the Nisga'a villages. Notable effects as a result of the addition of the Galore and Schaft Creek projects on in-migration and the number of Nisga'a employed were not anticipated, due to their remote locations. As a result, Scenario 3b is expected to quite similar to Scenario 2b.

The following are considered the key cumulative incremental effects of Scenario 3b, high regional development with the Brucejack Gold Mine Project on Nisga'a social conditions:

- Increased demand for housing:
  - As with Scenario 2b, housing capacity is reached as a result of in-migration.
- Increased pressure on community infrastructure:
  - Demand on Highways 37/37A road infrastructure is maintained.
  - Pressure on water and sewer services at Gitlaxt'aamiks continues.
- Increased demand for community services:
  - Additional demand for health, education, and other social services is limited, but comparable to Scenario 2b. Some continued demand on social services (e.g., for counselling services linked to substance abuse and other domestic issues) for those who experienced negative social outcomes.
- Increased risk to Nisga'a worker and citizen health:
  - Overall risks to health remain low and are not expected to increase. The incremental impacts noted in Scenario 2b are maintained.
  - For Nisga'a workers, accident risk due to vehicle collisions and other traffic accidents is maintained due to higher traffic volumes. Occupational risk associated with operation employment continues to reflect the nature of the mine setting and transportation to and from the mine.
  - For Nisga'a citizens, no additional increase for potential adverse health effects with inclusion of the Brucejack Gold Mine Project. Accident risk due to traffic volumes on Highway 37/37A is maintained, albeit by traffic volumes associated with a different mix of projects.

- Changes to community well-being:
  - Similar to Scenario 2b, potential for increased social risks and benefits as in-migration and the number of Nisga'a employed by the projects increase. As noted earlier, the potential for adverse effects associated with increased incomes and shift work may or not may be realized as it is dependent on individual choices and behaviours, and is typically related to a pre-existing condition.
  - Potential for increased levels of substance abuse and related domestic issues as the number of project employees increases and employees with newly acquired, higher than average income seek to establish a healthy work/life balance.
  - There is potential for increased levels of crime in the Nisga'a villages as income disparities are now more prominent.

The cumulative-incremental effects of Scenario 3b high development on Nisga'a social conditions are similar to those conditions noted in medium development Scenario 2b. The notable exceptions are the potential for some additional traffic volumes, corresponding accident risk, and differences in community well-being that reflected the transition of projects from construction to operation. Overall, cumulative-incremental effects are expected to stabilize (or reduce) over time as individuals and communities become more accustomed to project employment and increased populations in the Nisga'a villages. Overall, the projects expected to be most relevant to Nisga'a future social conditions are the Brucejack Gold Mine Project, the KSM Project, and the Kitsault Mine Project, as these are expected to provide the greatest employment opportunities for Nisga'a and have the potential to result in some level of in-migration to Nisga'a villages.

6.8 SUMMARY OF SOCIAL IMPACTS

The social impacts of the Brucejack Gold Mine Project and other projects will, to a large extent, be an outcome of the number of Nisga'a citizens who obtain mine employment and where they choose to live. The assessment rests on this primary assumption that social impacts on Nisga'a citizens and communities will stem from the potential influx of people and money during mine construction and operation phases and the potential loss of these in the wake of mine closure.

In many respects it is a simple calculation: the greater the number of people who move back to the Nisga'a villages and the more mining jobs taken up by Nisga'a citizens, the greater the impacts, both positive and negative, on Nisga'a society. On the other hand, social change is highly complex and contingent on many foreseeable and unforeseeable factors. Individual choice and behaviour have much to do with how the social impacts of the projects are perceived and responded to. Local institutions have an important role to play in how Nisga'a citizens and communities cope and manage the opportunities and risks that arise in the future, whether these originate from mining development or other local, regional, or more distant forces. For both the Nisga'a and the proponent, however, there are conclusions that can be made regarding tangible social effects as revealed in this assessment.

It is expected that the Project will create employment opportunities for Nisga'a citizens, which will bring higher incomes to the communities and, in some cases, will attract Nisga'a to move to (or back to) Nisga'a communities. Migration of Nisga'a citizens both into and away from the Nass Area is

expected to result in an overall net increase in village populations. More people may put a strain, at least initially, on housing which is already at or near capacity. There will be an increase in the demand on infrastructure but key service infrastructure is in place and believed to be well situated for expansion to accommodate the moderate level of population increase anticipated. Population increase at Gitlaxt'aamiks will likely be closely monitored by NLG and Gitlaxt'aamiks Village Government as the current water and sewer systems are presently operating at capacity and require upgrades. Health and education services appear to be relatively well positioned so as to not be negatively affected by increased demand and, in fact, the Nisga'a education system would likely benefit from increase in the student population to help stem recent declines and to support current literacy, numeracy, and comprehension initiatives underway as part of the restructuring of SD 92.

Jobs and other economic activities will increase incomes and revenues in the communities, which are expected to have both positive and negative social outcomes for Nisga'a citizens. For the majority of individuals who obtain project employment, positive outcomes are expected to result from gainful employment and income. The mine work rotation schedule may have a negative effect on family cohesion due to separation of employees from their families, although many feel that the characteristics of Nisga'a culture and society and the benefits of secure employment would offset these adverse effects. Direct Project activities such as mine related transportation that traverse portions of the Nass Area along Highway 37 and 37A to supply the construction, operation, and decommissioning of the mine may have some impact on the overall risks of accidents for Nisga'a workers and citizens living in the Nass Area, and could put some strain on emergency services. In sum, however, the Nisga'a Villages are relatively remote from Highway 37, thus transportation effects are anticipated to be negligible.

While individual choice plays a role in determining outcomes, prior knowledge of the pattern of events that typically unfold as a result of resource development projects involving small, rural, isolated communities, provide an opportunity for all parties involved to establish a successful model or process that is more likely to produce positive outcomes and mitigate potentially negative ones.

The impact on housing and community infrastructure over the course of the Project's life is likely to go through a series of peaks and valleys, dependent on the in-migration realized. Overall, it is predicted that housing will be the most generally affected component of local infrastructure as it is widely reported that over-crowding is a pre-existing condition in all of the Nisga'a villages. This shortage, even if it is only a perceived shortage, could become an important barrier to Nisga'a citizens who are contemplating moving to (or back to) the Nass Area.

It is difficult to predict, with any certainty, what will happen to the local Nisga'a population during decommissioning and closure of the Project or whether the transition from Project construction to operation will produce changes to population within the Nisga'a villages. The obvious assumption is that closure of the mine would lead to layoffs and a possible exodus of people in direct relation to the number of Nisga'a employed by the Project at that time. However, an argument can be made that it is just as likely that other regional economic development, for example other mine projects as described in the medium and high development scenarios, would present other employment opportunities that would enable people to stay in their community following construction and potentially beyond closure and decommissioning. It is also foreseeable that local Nisga'a could be ideal candidates for

the mine decommissioning phase work and work on other projects that may be coming online at that time due to their location and potential experience with the Project to that point.

Some services, such as health care, may require additional resources if a notable increase in population were to occur. Although some focus group participants stated a preference for health services in Terrace, this was usually a result of negative experiences with health services in the Nisga'a villages, such as long wait times for an appointment. However, the ability to access health services in Terrace requires financial resources associated with travel. Focus group participants indicated the local schools have the capacity to take on additional students as the classroom space is available, but also indicated additional teachers would likely be necessary, a conclusion which is somewhat at odds with the comparatively low student-teacher to ratio (approximately 12:1). Any additional demand or impact on emergency services in the Nisga'a villages in relation to mine development is expected to be linked to either accidents involving transportation to and from mining sites or in relation to social and domestic issues in the communities themselves (see Sections 4.4 and 4.5). In the case of the latter, it is noted that any causal linkages that may exist between mine development and social issues are contingent upon many factors that are well beyond the scope of this assessment to investigate or fully explain.

In sum, the effects of the Brucejack Gold Mine Project on Nisga'a social conditions are not expected, on whole, to be realized immediately. Rather, each effect is dependent on the extent of in-migration and increased population over time. Specifically, the potential effects of the Project are as follows:

- Housing: some increased pressure on housing stock, reflecting the level of in-migration realized. Effect is somewhat offset by the presence of income earners and development of new housing over time.
- Community infrastructure: some increased pressures on Gitlaxt'aamiks water and sewage systems. Effect is somewhat offset by the increase ability of NLG and village governments to provide services based on increased income tax revenues.
- Community services: education, emergency, health and social services are expected to be adequate, although there is some potential for strain on emergency services.
- Community well-being: the provision of employment income and related work rotation scheduled is expected to have some effect on family dynamics; however, the potential for positive vs negative outcomes is dependent on individual choices and is expected to be relevant only to a small portion of those who obtain Project employment. This effect may be offset by programs and services currently available to Nisga'a within the villages.
- Nisga'a worker health: effects are anticipated to be minimal and are limited to those associated with the mine setting, physical work, and increased traffic volumes and travel for work.

7. CULTURAL IMPACT ASSESSMENT

7.1 ASSESSING CULTURAL IMPACTS

Aboriginal culture is susceptible to various impacts associated with natural resource development projects. Mining operations, through socio-economic and environmental interactions with Aboriginal communities and people, may alter or diminish places and practices that support individual and community identity, resource-based livelihoods, and other elements of Aboriginal culture (IFC 2006). This section identifies and evaluates specific impacts on Nisga'a culture that may arise from the Brucejack Gold Mine Project.

Attempts to predict the impacts of mining projects on culture are inherently subjective, especially at the scale of a single project. Cultures are complex and the reasons for how and why they change are hard to predict and difficult to measure. The cultural impacts of mining may be very real, but to separate these impacts from other broader regional or societal forces runs the risk of either understating or overstating the effects of a single project. It is inevitable that perceptions will vary considerably among individuals and families with respect to the impact of the Brucejack Gold Mine Project or any other project on Nisga'a culture. It is also likely that the effects of the Project will vary by individual and family as certain effects may be more relevant to some and less to others.

Examples of the impacts of mine-related work schedules and incomes on Aboriginal peoples and communities have been shown in other contexts (e.g., mines in northern Canada) to affect several dimensions of culture including (MVEIRB 2009):

a) Values – working conditions that do not incorporate local cultural values and norms can contribute to the erosion of cultural values or alienation of individuals or groups;

b) Population in-migration – an influx of new people to an area that are not from the local cultural group can also influence community and workplace values and non-Aboriginal ways of being and doing;

c) Methods of cultural transmission – changes in organizational and social structures may lead to cultural loss (e.g., a decline in transferring inter-generational cultural knowledge);

d) Language dominance – contribution to cumulative loss of aboriginal language; and

e) Sense of self, of place, and overall well-being – loss of a sense of control over one's own fate, ability to influence and be influenced by aspects of culture, and health impacts caused by changes to the culture (e.g., unhealthy coping strategies like alcohol abuse and dietary change).

This list illustrates the scope of adverse cultural impacts that may be associated with mine-related employment although not all of these may be relevant to the Nisga'a context. A project may also contribute to beneficial effects on culture that might arise in relation to improved self-esteem, poverty reduction, and income security associated with employment income and/or business opportunities as was discussed in several of the Nisga'a focus groups.

In light of these limitations and challenges of cultural impact assessment, the ESCIA Guidelines focus on targeted dimensions of Nisga'a culture for which a meaningful assessment of Project impacts might be undertaken. Those aspects of Nisga'a cultural activities and practices identified for assessment in the context of proposed resource development as stated in the ESCIA Guidelines include:

a) direct project-related environmental impacts on Nisga'a cultural resources, activities and practices;

b) effects of changing work patterns and incomes on Nisga'a cultural activities and practices; and

c) effects on the Nisga'a language.

These elements of Nisga'a culture provide a framework for the consideration of interactions between mining projects and Nisga'a culture. Evaluation of the effect of the Project on Nisga'a language was scoped out of the current cultural impact assessment (Section 3) and, thus, is not discussed further here.

The two VCs of Nisga'a culture identified for assessment in the scoping exercise described in Section 3.1.2 include: (i) culturally important resources and sites; and (ii) participation in cultural activities and practices. These VCs are defined and discussed in Sections 7.2 and 7.3.

7.2 CULTURALLY IMPORTANT RESOURCES AND SITES

Resource harvesting is undertaken to support household livelihoods and for commercial, cultural, and ceremonial purposes (community and family feasts). Although results from the SERC Survey suggest the cultural use of land and aquatic resources has declined from what it was in the past, focus group participants temper this perspective arguing that being able to access and use the land and resources is an important affirmation of Nisga'a culture (Rescan 2012b, 2012a). The knowledge that the opportunity is available to pursue traditional livelihood practices is seen as being as important as the actual practice of harvesting wildlife, fish, or plants. While the cultural use of land and aquatic resources has likely declined from what it was in the past, a substantial portion of Nisga'a, particularly those resident in the villages, continue to participate in the subsistence harvesting and other cultural resource use (Focus Groups, SERC, 2014 Fieldwork).

Economic and labour market issues related Nisga'a commercial resource and potential Project effects are addressed in Section 5.6. This section addresses cultural dimensions of non-commercial resource use. It considers Nisga'a perceptions of mining's impacts and assesses the main pathways by which the Project may impact Nisga'a citizens' ability to access cultural resources and participate in cultural, activities and practices.

7.2.1 Nisga'a Perspectives on Culture, Ecology, and Mining

Concern about the potential environmental effects of mining was a frequent topic of discussion in the Nisga'a focus groups. Nisga'a participants framed such impacts in terms of potential risk to cultural

practices and identity. Community perceptions and opinions about the potential environmental effects of mining are shaped by historical experience with the original Kitsault mine.[35] Concerns revolve chiefly around the possible impacts on fishing and wildlife through downstream environmental effects. The legacy of the previous Kitsault mine and the submarine disposal of tailings came up frequently in virtually all of the adult focus groups. Based on these historical recollections and an apparent dearth of information with respect to current projects,[36] the focus groups reveal an underlying concern about the interaction of mining projects with culturally important environmental resources and values.

In focus group interviews Nisga'a also expressed optimism about potential mining-related economic opportunities, although it was routinely tempered by caution and concern about potential environmental impacts (Rescan 2012b, 2012a). Nisga'a concern about ecological health is a multi-dimensional, social, economic, and cultural concern, "…for Nisga'a people, everything is interrelated—the food, the economy, and education" (Rescan 2012b, 2012a). As one focus group participant commented, "our ecology is our economy…diminishing access to [harvesting] would affect our future, our children, our economy. We would become apathetic. We would have no drive" (Rescan 2012b, 2012a). Consistent with this perspective, participants frequently framed Nisga'a cultural identity as that of stewards of the land – a common and powerful theme in many Aboriginal cultures – and with that stewardship, the self-identified responsibility of protecting the land for future generations (Rescan 2012b, 2012a).

7.2.2 Nisga'a Non-commercial Resource Use

Nisga'a use natural resources on Nisga'a lands within the Nass area for a number of traditional, cultural, and commercial activities. Key cultural-environmental practices and activities identified in the survey and focus groups included hunting, trapping and fishing, mushroom picking, and the harvest of country foods, medicinal plants, materials (e.g., cedar bark for fibre), and other culturally important resources (Rescan 2012b, 2012a). The level of contemporary use of non-commercial resources is illustrated in Table 7.2-1 with results from the SERC Survey regarding current country food consumption.

A recent report "How Healthy are We?" (George 2011) describes the results of a community-based health survey conducted with 288 Laxgalts'ap residents. The findings of this survey supports the findings of the SERC Survey, indicating that over half of Nisga'a adults eat freshwater fish often and about a third eat wild animals (moose, smax, wan) or saltwater fish (txux) often. Nisga'a continue to engage in the cultural use of natural resources in a number of ways (e.g., eulachon camps; Nisga'a ESICA Fieldtrip 2014).

[35] During focus group discussions, participants commented on the impacts of the previously operating Kitsault mine and identified the tailings as a concern. Generally, people are unsure of the impacts of the old Kitsault mine, citing a lack of information and the subsequent preponderance of rumours and speculations about specific effects (e.g., deformed fish, low catch rates) thought to be related to past environmental damage.

[36] Focus group participants frequently stated a lack of knowledge of the specifics of proposed mines such as the new Kitsault Mine Project or the KSM Project.

Table 7.2-1. Reported Consumption Frequency of Country Foods

	Consumption of Wild Meat		Consumption of Wild Berries/Plants		Consumption of Wild Fish	
	Frequency	Valid Percent	Frequency	Valid Percent	Frequency	Valid Percent
Daily	17	4.2	38	9.4	68	16.8
Once or twice a week	129	31.9	129	31.9	263	64.9
Once a month	83	20.5	100	24.7	50	12.3
Once every few months	131	32.4	116	28.6	22	5.4
Never	44	10.9	22	5.4	2	0.5
Total	**404***	**100.0**	**405**	**100.0**	**405**	**100.0**

Source: (Rescan 2012b, 2012a).
**One missing case due to no response.*

7.2.3 Potential Effects on Culturally Important Resources and Sites

7.2.3.1 Population Pressure and Increased Access

The development of the Project access road and transmission right-of-way could make it easier for vehicles and people on foot to access some of the back country in the vicinity of the Project, which could have both beneficial and adverse effects on Nisga'a cultural values related to natural resource practices and activities. In focus group interviews Nisga'a expressed concern about the extension or improvement of roadways into previously inaccessible areas as potentially increasing pressure on various culturally important resources (Rescan 2012b, 2012a). Some focus group participants expressed concern that wildlife may relocate as a result of mine-related activities, drawing on similar experience in relation to logging activities in the past. Others noted potential over-harvesting of berries and possibly other food and medicinal plant resources by Nisga'a citizen themselves linked to an increase in the number of Nisga'a in the villages as a result of migration, combined with increased income and the ability to purchase better hunting technologies and equipment (e.g., rifles, snowmobiles).

Controlled access along Project roads will help to limit additional hunting and fishing pressure in the back country although restrictions are likely to apply only to Project-specific roadways (e.g., Brucejack Access Road). There is potential for increased harvesting of cultural resources by Nisga'a and non-Nisga'a as a result of the transmission line right-of-way running north from the old Granduc mine area. That is, the development of the transmission line right-of-way creates an opportunity for hunters to access previously inaccessible areas more easily.

Similar to hunting, trapping, and fishing effects, the relative remoteness of the Project and control of access will reduce additional pressure on these resources induced by Project development.

Most impacts on Nisga'a cultural use of fish, wildlife, or other aquatic or terrestrial resources will arise in relation to the effects of increased traffic along mine route segments (e.g., as they traverse stream crossings), and the various localized effects of Project construction and operation.

Neither the Project site nor its infrastructure including access roads or transportation routes intersect with Nisga'a trap lines or other formal land or resource use tenures, as those which belong to Nisga'a citizens are located well to the south of the Project and, therefore, based on available information, effects on Nisga'a activities in the vicinity of the Project are expected to be negligible.

7.2.3.2 Project Related Environmental Impacts on Cultural Resources and Sites

In part, the interaction between Nisga'a cultural uses of land and water resources and the activities and components of the Brucejack Gold Mine Project is tempered by the distance between the main area of influence of Project and Nisga'a Lands. Regardless, Project infrastructure is proposed within the Nass Area and, therefore, has the potential to affect Nisga'a interests and cultural values (see Section 1.1 and Figure 1.1-1).

The Brucejack Gold Mine Project Application/EIS, which is being prepared concurrently to this report, includes scientific determinations of the significance of the Project's environmental effects on biophysical and ecological systems and components including air, water, wildlife, fisheries, and aquatic and terrestrial ecosystems. Each discipline-specific chapter of the Application/EIS provides extensive baseline detail and assessment of potential environmental impacts on ecological values and biophysical processes over the life of the Project. These assessments provide an empirical basis from which to consider the potential interactions with, and effects on, specific attributes of Nisga'a cultural values, practices, and activities.

Certain cultural impacts are likely to be a corollary effect of any environmental changes that occur. For example, changes in the population or migration patterns of important wildlife species such as moose may affect Nisga'a cultural activities that involve the harvest and consumption of wild meat. The reader is directed to the Application/EIS for specific details on the characterization and evaluation of potential effects, proposed mitigation, and determinations of the significance of residual adverse effects of the Project on relevant biophysical and ecological values.

In general, the Project is subject to numerous federal and provincial guidelines and permitting requirements, the goal of which is to ensure that these are adhered to and thereby reduce or eliminate the possibility of environmentally induced impacts on Nisga'a cultural activities and practices (see Section 6.5.1).

Consideration is given to the potential for reduced access to culturally important resources as a result of Project induced in-migration. Predicted migration to the Nisga'a villages may increase pressure on commonly harvested species in the vicinity of the Nisga'a villages, reducing the availability of these species to long-time village residents. Notably, this effect is inherently characterized by an increase in cultural harvesting activities. That is, should Nisga'a who migrate (back) to the villages from urban centres for employment begin to participate in subsistence harvesting or eulachon spring harvest activities, the Project may be determined to have increased the level of participation in cultural activities. While this effect is not expected to be substantial, it is directly linked to changes to participation in cultural activities.

7.3 PARTICIPATION IN CULTURAL ACTIVITIES AND PRACTICES

The second valued component of culture that might be affected by the Project is the ability to participate in culturally important ceremonies, activities, and practices. Full-time employment and especially shift work can disrupt harvesting practices and reduce community access to country foods and hinder participation in important community events and ceremonies (Gitlaxt'aamiks Village Government: pers. comm.; Rescan 2012b, 2012a). Higher wages and greater disposable income might lead people to become more reliant on store bought foods, which might inadvertently undermine certain cultural practices at the same time that it enables purchase of equipment and supplies to support harvesting efforts and other cultural practices (Gitlaxt'aamiks Village Government: pers. comm.; Rescan 2012b, 2012a).

Potential cultural and related effects linked to the specific shift work patterns associated with mine employment were discussed at length in the focus groups. At an abstract level focus group participants linked the potential loss of cultural practices to a variety of socio-cultural effects such as: mental stress and illness; low morale; strains on family and other relationships; and the undermining of certain communal values. In practice participants felt that fly-in/fly-out shift work would not have a major impact on resource harvesting or traditional ceremonies. However, many participants also shared the expectation that mine employers should be sensitive to the cultural obligations of Nisga'a workers (Rescan 2012b, 2012a).

Similarly, an InterGroup (2005) study that looked at fly-in/fly-out shift rotations identified adverse effects including impacts on the availability of workers to be fully involved in community activities, traditions and ceremonies, and subsistence activities. The same study also found concurrent, beneficial effects such as enhanced ability to participate when off-shift and the potential for shift work to be adaptable to seasonal resource harvesting and or community events (InterGroup 2005).

This section considers how employment with the Project could affect the way Nisga'a citizens pursue traditional activities and livelihood practices. Data from the SERC Survey and Nisga'a focus groups were generally corroborated in the group interviews held in January 2014, provide insight into the attitudes and perspectives of Nisga'a citizens as to how the Project may affect participation in cultural activities. Some of these changes and issues are closely related to aspects of the social impacts discussed in Section 6.

7.3.1 Mining Work Schedules and Nisga'a Cultural Practices

The work schedule for the Project is expected to require employees to live at the mining camp away from their families and community. Mining work schedules reduce the amount of time people are able to dedicate to hunting, fishing or the gathering of plant and berries. In one study 71% of Aboriginal workers reported spending less time out on the land (Gibson and Klinck 2005). Nisga'a employees working shift rotations may have less opportunity to participate in a range of cultural activities and practices. Participation in harvesting activities while on shift is likely to be prohibited and when off-shift workers may prefer or find it necessary to spend time with family and friends in their home community rather than spend their time-off out on the land.

Certain cultural activities have narrow windows of opportunity, constrained by seasonality or migration, which may lead Nisga'a workers to miss key harvesting times. For example, working at the Project could mean missing some or all of the oolichan harvest and oil processing, a significant annual cultural event (Gitlaxt'aamiks Village Government: pers. comm.; Rescan 2012b, 2012a). Certain family or cultural events such as community feasts occur at a fixed time of year or on a specific date which on-shift Nisga'a workers would miss unless they were able to reschedule or get the time off. Many important cultural events are planned well in advance, however, which would enable workers to plan their work schedule with their employer (Gitlaxt'aamiks Village Government, pers. comm.).

Respondents to the SERC Survey cited lack of time and missing limited seasonal harvest opportunities as key potential effects of being committed to a work shift rotation. It was noted that missing out on harvest opportunities could have the supplemental effect of leaving a family or household with a lack of food to get through the winter. The loss of opportunities for learning traditional skills and knowledge from Elders was also noted. Reduction in resource harvesting practice and related traditions and ceremonies (e.g., feasts) undermines knowledge exchange and the continuity of culture (Gibson and Klinck 2005). One participant from an Elders' focus group voiced concern about the loss of opportunities for the "…transmission of cultural knowledge to younger generations" (Rescan 2012b, 2012a). Over half of the Nisga'a SERC Survey respondents (56.4%) stated that work patterns would affect their ability to participate in cultural activities and/or attend important cultural, family, community events (Rescan 2012b, 2012a).

The Mackenzie Valley Environmental Impact Review Board's (MVEIRB) cultural impact assessment guidelines (under development) acknowledge the importance of work conditions and implications of these issues on the surrounding communities (MVEIRB 2009):

> *People feel that their work conditions are not always sensitive to their cultural needs. For instance, some people have left (and lost) their jobs to be able to attend the funeral of an important Elder or other prominent community figure who was not a blood relative. The lack of cross-cultural sensitivity at the work site can mean the difference between getting a job and keeping it.*

Similarly, Nisga'a focus group participants interested in mine employment indicated a need for employers to better understand Nisga'a cultural commitments, such as attendance at funerals. Other cultural ceremonies and events are planned well in advance, giving employees and employers opportunity to plan around such events. The presence of certain individuals to facilitate funeral arrangements and fulfill other related cultural obligations may, at times, be required without prior notice (Rescan 2012b, 2012a).

Respondents to the SERC Survey were split more or less equally (see Table 7.3-1) between those who thought that their harvesting activities would be affected (49%) and those who thought that their harvesting activities would not be affected (51%) by mine related work schedules and shift work (SERC Survey Statistical Report 2012; Rescan 2012b, 2012a). Those that believed it would affect harvesting thought limited time to undertake harvesting would be the main effect and that effects would typically be seasonal (Table 7.3-2). Effects from employment at the mine on resource harvesting activities were rated as positive by 16.5% of respondents, neutral by 46.7% of respondents, and negative by 36.8% of respondents. Nisga'a citizens living in the Nass are more concerned that mine employment will interfere with resource harvesting, than Nisga'a citizens living in Terrace, Prince Rupert and Vancouver.

Table 7.3-1. Would a Remote Job Affect Your Resource Harvesting?

	Total Sample		Living on Nisga'a Lands		Living off Nisga'a Lands	
Response	Frequency	Valid Percent	Frequency	Valid Percent	Frequency	Valid Percent
Yes	172	48.7	113	55.7	59	39.3
No	181	51.3	90	44.3	91	60.7
Total	**353**	**100.0**	**203**	**100.0**	**150**	**100.0**

Table 7.3-2. How Would a Remote Job Affect Resource Harvesting Activities?

Response	Count	Responses (%)	Cases (%)
No time to harvest/fish/plant	97	44.7	57.4
Depends on the season	79	36.4	46.7
No food for my family/for winter	19	8.8	11.2
Environmental hazards pollution concerns	6	2.8	3.6
Being away from home/family	10	4.6	5.9
Other	6	2.8	3.6
Total	**217**	**100.0**	**n/a**

Notes:
Percent of cases is based on 169 valid cases.
Percent of responses may not sum to 100% because of rounding error.
Total percent of cases is n/a because it exceeds 100% due to multiple responses.

Focus group participants spoke of some cultural responsibilities being more important than others. For example, in one group there was much debate around the implications of schedule conflicts between mine work and key times of year for the harvest and processing of fish. One man offered that a mine employee could have a relative assist with processing in his place. Another participant thought that this would change the relationship people have with food and stated the options were to "either work for money to buy food, or stay at home and be able to get your own food." General concerns were expressed around having to miss the processing of fish and how this would impact people and culture (Nisga'a Focus Group Interviews 2012; Rescan 2012b, 2012a).

Some participants anticipated possible impacts of shift work on community involvement and volunteerism as people would be less available to contribute to community events and activities. This negative effect is potentially counter balanced by the availability of people when they are off shift.

The importance of participation in cultural activities such as ceremonies, weddings, funerals and other events such as feasts was discussed at length in the Nisga'a focus groups. Perspectives and opinions about the cultural impact of Nisga'a workers missing out on cultural ceremonies and events varied substantially. Some regard the introduction of mines and mining employment as likely to have a negative impact on ceremonies, while others felt the effect would be minimal. Some went so far as to say that Nisga'a culture is too strong to be affected by the absence of a single person.

Elders shared similar thoughts about potential conflicts between mine work and cultural activities. Focus group participants commented on the obligation of employers to seek ways to accommodate

certain cultural needs and obligation. For example, "…people need to be part of stone moving feasts if they are part of the family…and the [mine company's] HR departments [sic] need to be tolerant and sensitive to Nisga'a culture" (Nisga'a Focus Group Interviews 2012; Rescan 2012b, 2012a).

Especially important to Nisga'a is the attendance of the person designated as "undertaker" at the time of a Nisga'a person's death. Briefly, the identity of the "undertaker" may not be known until the time of death, and the designated person is typically someone close to the family who is not directly related to the family. The undertaker is responsible to oversee most aspects of the funeral and to ensure the payment of settlement fee's[37] for the deceased. The oversight of the undertaker allows the direct family members privacy and time to grieve.

In considering the impacts of Project employment and work schedules on Nisga'a, extended periods of time off may enable individuals who are designated as undertakers to fulfil their cultural duties either in their regular time off work (e.g., two weeks) or by swapping shifts to adjust time off schedules to be ensure their availability and ensure their cultural duties.

Some focus group participants noted that if many people from one family were away for work at the same time, feasts and ceremonies would be notably altered. One urban focus group grappled with the idea of money or income pitted against culture, while another felt the Project would not have an impact on Nisga'a culture and stated that cultural events could be planned around shifts.

For Nisga'a citizens and their families who obtain work at the mine or otherwise devote a portion of their time to mine-related activities there is expected to be some effect on their capacity to carry out or participate in Nisga'a cultural life. Employment with the Project is expected to affect traditional resource harvesting activities for a number of Nisga'a citizens, especially those living on Nisga'a land. In many respects, however, the impact of Project shift work is likely to be felt most acutely at an individual level rather than to cause widespread cultural change.

Cultural change linked to mine employment and work schedules will not take place in a vacuum. Focus group responses and SERC Survey comments made it clear that Nisga'a would actively adapt and respond to changing conditions and similarly adapt to scheduling challenges and issues that might arise from mine work schedules.

Others noted that traditional land and resource use may even be enhanced by mine development to the extent that increased incomes associated with mining employment would enable individuals to purchase needed equipment and supplies (e.g., boats, motors, firearms, fuel, ammunition, traps, fishing gear, all-terrain vehicles) and thereby increase their opportunities to engage in resource harvesting activities.

Elders pointed out that many Nisga'a people had previous experience with shift rotations and remote work sites and that there would be little if any negative impact due to shift schedules as "people will adjust...people need the income so they'll make it work". Others agreed that, "…people

[37] Settlement fees are those costs associated with ones funeral and final arrangements.

have experienced interruptions to land use activities before. If you work, you work. If you come back during hunting season, then you go out and hunt. People will be happy to work." Another participant suggested hunters would simply adjust their schedules so they could hunt during their time off, comparing it to individuals who were currently taking time off work to be at the fisheries camp (Nisga'a Focus Group Interviews 2012; Rescan 2012b, 2012a).

It is not unusual for Nisga'a citizens who move away from the villages to seek seasonal work, or are currently employed in seasonal jobs. Shift work would be much the same and was not seen as an issue of particular concern.

Participants on one focus group felt the projects would have no impact on harvesting, although some participants thought this was due to the lack of current participation in harvesting activities because of the increasing reliance on store bought food. Another participant stated very few people were living off the land today but those who did, shared with others (Nisga'a Focus Group Interviews 2012; Rescan 2012b, 2012a).

Some of the focus group participants felt that changes in work patterns would simply change who did the harvesting. For instance, some Elder participants suggested that "...mines would take young people away from harvesting activities, but maybe this would cause Elders to do more harvesting themselves….Others will have to do your harvesting and food preservation for you." The idea of substitution was echoed in two women's focus groups where consensus was that, "There won't be any impact to [sic] fishing, it'll just be different people doing the fishing" (Nisga'a Focus Group Interviews 2012).

Women's groups seemed to think similarly about the resilience of Nisga'a ceremonies, "…even if [many] people from the village go to work in the mines, we will just go to the ceremonies without them". The main exception is role of the undertaker at Nisga'a funeral ceremonies. Participants indicated that when a Nisga'a person dies, the mine companies should ensure that the family of that person is able to return to the Nass Valley to "see that person off" (Nisga'a Focus Group Interviews 2012).

Another of the women's focus groups discussed the trade-off between employment and having to accept shift work. This group felt employment would have an overall positive impact at the local level and that shift work was a small price to pay to obtain badly needed jobs. One woman commented: "It would be up to us women to set a good example and be good role models for the next generation" (Nisga'a Focus Group Interviews 2012).

Participants in the men's focus groups were more outspoken about the importance of being present for and participating in cultural and community events. All men's focus groups indicated it would be important for mining employers to respect Nisga'a culture and allow employees to return home for cultural and family events. Male participants thought that mining employment could be a negative influence on Nisga'a culture if men are out working and are unable to return home for funerals.

Finally, it was noted that Nisga'a employees may have less access and opportunity to consume traditional food that they would normally eat in their community, such as wild meat, fish and plants/berries. Nisga'a Elders voiced concern about a potential lack of access to traditional foods at the mining camp and wondered whether or not mine management would be sensitive to, and accommodate Nisga'a food preferences. Again, such effects may manifest more at the level of the individual and are not likely to have broader cultural impacts.

7.3.2 Cultural Effects of Changes in Income Levels

The mining industry has typically had among the highest wages in Canada compared to other resource sectors, often double the average weekly earnings of other industries (Gibson and Klinck 2005). The cultural effects of higher incomes are complex, tightly coupled to social effects (see Section 6.3), and likely to produce a combination of both positive and negative outcomes (Gibson and Klinck 2005; Rescan 2012b, 2012a).

According to Gibson and Klink (2005) high mining incomes often have the unintended consequence of increasing income disparity in Aboriginal communities which, in turn, is associated with erosion of communal or collective cultural values. Gibson and Klink (2005) also point to indicators of greater individualist values and behaviour such as mine workers "spending hard" on themselves when off shift, or spending less time with fellow community members in pursuit of traditional livelihood activities such as hunting which in the past had strong communal elements to them.

The Gibson and Klink (2005) study also found contrary evidence that higher incomes in Aboriginal communities may also strengthen cultural values and practices. Higher wages earned by mine workers may actually facilitate greater sharing, for example, of equipment, fuel, or other goods or opportunities that may be more obtainable for community members with disposable income from employment (Gibson and Klinck 2005). Focus group participants acknowledged these potential beneficial outcomes but noted that individual choice and behaviour would be a key determinant of whether or not increased incomes result in positive or negative outcomes (Rescan 2012b, 2012a).

The Elders' focus groups in particular compared the potential effects of mining employment and income to the "logging boom years" when people hunted less and spent more at the store "in town". Elders commented that, although the mine may have a "big [negative] impact on harvesting," the positive side would be that with more income, people would be able to buy more equipment to help with access to hunting sites (Rescan 2012b, 2012a).

Despite these conflicting views and an underlying scepticism about whether or not mine jobs will actually materialize for Nisga'a citizens, there is a belief that positive cultural effects can arise from timely and appropriate mine related employment.

7.3.3 Eco-cultural Tourism: Links between Nisga'a Culture and Economy

Contemporary Nisga'a cultural practices and activities are not limited to traditional resource harvesting practices described above. The Nisga'a Business Survey (Rescan 2012b, 2012a) illustrates that current Nisga'a cultural-ecological connections extend into other realms where culture and environment play prominent rolls in the Nisga'a economy. The Nisga'a Business Survey indicates that several Nisga'a businesses and NLG itself have both business and cultural interests in ecological and wilderness values. Nisga'a eco-tourism and wilderness-dependent businesses reflect close ties between the Nass Area's wilderness and environmental setting and Nisga'a cultural values.

Cultural sites and traditional practices are sources of pride and cultural vitality that are shared with visitors to the area. The cultural value of the Nass Area for tourism arises from the central importance of ecological and wilderness values in Nisga'a culture, Nisga'a-owned tourism operations are dependent upon the integrity of the pristine wilderness of the Nass Area and Nisga'a cultural associations with the land.

Sightseeing, guide-outfitting, angling, and wildlife watching tours may be affected by an increase in population and migration of people to the area, and indirectly through increases in traffic and noise that may disturb wildlife. The scale of such interactions is expected to be quite limited due to the remote location of the Project. Some effect on roadside berry harvesting or wildlife viewing is possible along the Project's transportation routes, but again, it is expected to be negligible. Although some Project infrastructure would fall within the Nass Area where Nisga'a maintain certain non-exclusive rights and interests in using land and aquatic resources, the Project is remote from the Nisga'a communities and does not overlap with any Nisga'a owned-resource or recreation tenures (see also Section 5.6). Similarly, Nisga'a fishing and guide-outfitting operations are unlikely to experience negative effects from the Project because most cultural and economically important use of cultural-ecological resources takes place in and around Nisga'a Land and the lower Nass and not in the area of the Brucejack Gold Mine Project including the access road and the transmission line route.

7.4 CUMULATIVE-INCREMENTAL EFFECTS ON NISGA'A CULTURE

Broad cultural effects, should they occur, are more likely to arise as a cumulative and cumulative-incremental effect in response to multiple projects and more fundamental socio-economic changes. The cumulative-incremental effects of the Project are characterized through an examination of different development scenarios. These scenarios are described in detail in Section 2.2.4. Consideration is given to the potential effects of regional development on Nisga'a culture with and without the Brucejack Gold Mine Project.

7.4.1 Scenario 1a: Low Regional Development without the Project

The key cumulative-incremental effects of low regional development without the Brucejack Gold Mine Project on Nisga'a culture include:

- Direct project-related environmental impacts on cultural practices and resources:
  - Some short-term impacts on cultural practices are predicted as wildlife and related habitat experience some localized disturbances during construction phases.
- Impact of changing work patterns and incomes on cultural activities and practices:
  - Project employees may have reduced time to engage in cultural activities and access to increased income enabling a wider variety of options available in time-off. Effect is predicted to be minimal given low in-migration. Some short-term impacts as Nisga'a who obtain project employment are less available to attend some cultural events, ceremonies, or harvests.

For the non-mine projects considered in the low development Scenario 1a, there are relatively few employment opportunities during operation. As noted earlier, as of July 3, 2013 there were between 30 and 55 Nisga'a workers employed with the NTL project during construction (Nass Area Enterprises Ltd. 2013), meaning some potential for changes to Nisga'a participation in cultural activities has already occurred. Similarly, the low development scenario is based on projects for which construction is currently underway. As such, changes to participation in culture are expected to be discontinued when construction employment comes to an end.

7.4.2 Scenario 1b: Low Regional Development with the Project

The predicted cumulative-incremental effects of low regional development Scenario 1b on Nisga'a culture relate to increased employment opportunities with the Brucejack Gold Mine Project (see Section 5) and include:

- Direct project-related environmental impacts on cultural practices and resources:
  - The incremental effect on Nisga'a culture is considered low due to relatively low in-migration. Cultural resources such as wild game and fish are not expected to be adversely affected other than potentially in a very localized setting (e.g., in the immediate vicinity of the mine and along the Brucejack Access Road and transmission line).
- Impact of changing work patterns and incomes on cultural activities and practices:
  - Adverse cultural impacts are expected to be negligible to minimal. For those employed with the Project, impacts are predicted as Nisga'a who obtain employment are less available to attend some cultural events, ceremonies, or harvests.

7.4.3 Scenario 2a: Medium Regional Development without the Project

The expected cumulative-incremental effects of medium regional development Scenario 2a on Nisga'a culture include:

- Direct project-related environmental impacts on cultural resources:
  - The incremental effect of the KSM Project and the Kitsault Mine Project on Nisga'a culture is predicted to be higher compared to other project activities considered within the low development scenarios. Cultural resources such as wildlife and fish are expected to be primarily affected in very localized settings.
- Impact of changing work patterns and incomes on cultural activities and practices:
  - With an increase in Nisga'a employment with various projects, it is expected that an increasing number workers will be unable to participate in cultural events or activities, including harvesting, due to work commitments. Generational transmission of traditions and culture may be altered.
  - There are also predicted to be positive outcomes associated with increased income, enabling participation in traditional activities (e.g., income used to purchase equipment and supplies).

In additional, a positive impact is predicted on culture with any increase in the number of Nisga'a living in the Nass Area. The presence of additional Nisga'a participating in harvesting, ceremonies and other traditional activities serves to strengthen Nisga'a culture and promotes the intergenerational transfer of cultural knowledge.

7.4.4 Scenario 2b: Medium Regional Development with the Project

The combined cumulative-incremental effects of Scenario 2b projects (KSM, KMP, and Brucejack Gold Mine Projects) implies higher effects for two reasons: first, due to the high likelihood that Nisga'a citizens may obtain employment with each of these projects, and second, as a result of the expectation that some number[38] of people move (back) to the Nisga'a villages (see Section 4.2.2 for further discussion of potential migration scenarios). Key impacts on culture include the following:

- Direct project-related environmental impacts on cultural practices and resources:
  - The additional effect due to the addition of the Project is expected to be minimal. Cultural resources, such as wildlife and fish, are predicted to be only affected in localized settings.
- Impact of changing work patterns and incomes on cultural activities and practices:
  - Reduced or more restricted time to participate in cultural activities such as subsistence harvesting and ceremonies because of work commitments (linked to reduced exposure to cultural activities and reduced ability to transfer cultural knowledge to others through participation). Additional positive impacts associated with relatively high mine incomes are anticipated because increased income enables participation in activities (e.g., income used to purchase equipment and tools to facilitate enhance harvesting activities during time off).

As under Scenario 2a, with in-migration the presence of additional Nisga'a participating in harvesting and other traditional activities serves to strengthen Nisga'a culture and promotes the intergenerational transfer of cultural knowledge. With higher regional development, consideration is given to the possibility for change in participation in cultural activities as a result of the partial absence of individuals able to lead or organize the participation of others. Overall, it is expected that those who obtain project employment and who currently lead or initiate cultural activities will have the ability to integrate and continue with both livelihood aspects, as has been the practice of many currently employed Nisga'a.

7.4.5 Scenario 3a: High Regional Development without the Project

The high development scenario includes additional mining projects taking place in the general region of northwest BC; however, these projects are located well outside the Nass Area. The combined effects of projects considered within Scenario 3a imply a higher level of cumulative effects as compared to medium development Scenario 2a. But given the location and timing of the Galore Creek and Schaft Creek projects, the difference as they are expected to affect the Nisga'a are predicted to be marginal. In sum, the additional projects considered are not anticipated to be particularly relevant to Nisga'a participation in cultural activities or have impacts on cultural resources.

[38] The SERC Survey results indicated that in-migration to Nisga'a villages may represent for 9 to 11 people annually, to high of 22 to 25 people annually.

7.4.6 Scenario 3b: High Regional Development with the Project

The predicted cumulative-incremental effects of high regional development Scenario 3b include consideration of the Brucejack Gold Mine Project. The high development Scenario 3a (the addition of the Galore and Schaft Creek projects) is not expected to result in notable additional effects on culture compared with Scenario 2b.

7.5 SUMMARY OF CULTURAL IMPACTS

The cultural effects section examined potential effects of the Brucejack Gold Mine Project on several specific dimensions of Nisga'a culture and cultural practice due to potential changes to resource harvesting, shift work and increased incomes.

Nisga'a have the right to hunt and/or trap wildlife within the Nass Area and have specific allocations for initially designated species (Grizzly Bear, Moose, and Mountain Goat) as defined in the NFA. The access road and separate transmission line corridor both overlap portions of the Nass Area; however, according to findings in the Project's Application/EIS it is expected that after mitigation activities are fulfilled and effective, there should be little if any residual effect on Nisga'a harvesting practices. Impacts related to culturally important resource harvesting and use are expected to be localized to the mine site and along the access road. With respect to culturally or economically important food (e.g., berries) and medicinal plants, there are no anticipated effects for Nisga'a harvesters given the relatively small areas directly impacted by the Project and, more importantly, given the availability of other, more suitable areas for harvesting that are much closer to the Nisga'a villages. Nevertheless, some focus group participants were concerned that increased pressure on culturally important species would be a potential threat to what one Elder referred to as Nisga'a's "ecological economy."

Although not a universal view, many focus group participants supported the notion that the Project could also have beneficial effects with respect to Nisga'a culture. The view is supported by other research which has found that the creation of jobs in Aboriginal communities can strengthen cultural values in Aboriginal populations (Gibson and Klinck 2005). Mine work may prove to be more aligned with cultural values than welfare or dependency on government transfers. Nisga'a citizens may see an increase in sharing among community members, whether of money, food, fuel or equipment that may not otherwise be possible without the increased disposable income generated by mine employment and contracts.

The cultural effects related to shift work and increased income may be either positive or negative and depend on the number of Nisga'a that obtain mine employment, their ability to balance their current cultural activities and obligations, and the availability of family and community support. Results from the SERC Survey (Rescan 2012b, 2012a) reveal the range of opinion about how Nisga'a view the potential cultural impacts of mining projects (See Table 7.5-1).

Table 7.5-1. Nisga'a Perceptions of Cultural Effects from Mining Projects

Beneficial Effects	Agree	Neutral	Disagree
Would have positive cultural effect for the Nisga'a Nation	37.9%	32.6%	29.5%
Would have positive cultural effect for the community	32.7%	36.2%	31.1%
Would have positive cultural effect for (the survey respondent's) family	27.7%	39.1%	33.2%
Would have positive cultural effect for the survey respondent	26.3%	38.7%	34.9%

Opinions about the potential cultural effects of mining are clearly varied, although respondents view the broader cultural implication on Nisga'a communities and Nisga'a Nation as a whole more favourably and perhaps with more certainty than they view cultural effects at the individual or family level.

The Project is not expected to have notable impacts on access to culturally important resources and sites. While portions of the Project are located within the Nass Area, it is located at quite a distance from the Nisga'a villages. As indicated in the Application/EIS, the development of the Project is not expected to interfere with Nisga'a harvesting activities or to have notable effects on culturally important resources (i.e., wildlife, vegetation, aquatic species, and others).

On the other hand, Project employment is predicted to have some effect on participation in cultural activities and practices. That is, the shift work rotations characteristic of mine and other natural resource industries inherently reduces the amount of time individuals have available to them to participate in cultural activities. This effect is offset by the potential for employment income to enhance the quality of participation in cultural activities, or the ability of individual to purchase equipment and supplies that better facilities their focused involvement in cultural activities. Mine employment also provides higher than average incomes and increases spectrum of activities available to individuals in their time off.

In sum, the potential effects on the Project on culture are, in a sense, the known outcomes of the integration of western economies and indigenous cultures. Specifically, the main activities that may result in changes to culture (e.g., participation in culture and the transfer of cultural knowledge) are attributable to increased participation in the mainstream economy. Time away from traditional lifestyles, inherently equates to some reduction in the reproduction of culture and transfer of cultural knowledge to younger generations. This gradual progression has been taking place over a number of years; however, it is clear that Nisga'a have actively maintained and integrated elements of traditional culture into the daily routines and lifestyles that characterize community life in the villages. For example, ceremonies such as Hobiyee include sizeable evening gatherings in local recreation centers (e.g., approximately 50 to 70 people) that facilitate the practice and transfer of cultural knowledge through dance and story. In the face of change, the culture has shown to be resilient.

8. CONCLUSION

This report was written pursuant to the requirements of the Nisga'a Final Agreement, Chapter 10, paragraph 8(f). The NLG's framework document, the Nisga'a ESCIA Guidelines, provided the goals, focus, and structure around which the research, analysis, and report are based. The overall objective was to provide a comprehensive assessment of the economic, social, and cultural implications of the proposed Brucejack Gold Mine Project on Nisga'a people, Nisga'a Lands, and the Nass Area more generally.

Much of the available evidence used in this report, including the results of the focus groups and the SERC and Nisga'a Business Surveys conducted in 2011, as well as socio-economic fieldwork conducted in January 2014, involved primary research that provides a level of detail and evidence not ordinarily available in standard environmental and social impact assessments. As such, the report has provided a unique opportunity to investigate contemporary attitudes and perceptions of Nisga'a citizens with respect to both their current and future economic, social and cultural conditions. As might be expected, a wide range of opinions exist as to what mine development might mean for the Nisga'a. While the views of some are quite polarized, most participants in the research demonstrate a nuanced understanding of both the benefits and costs of development.

Clearly there are economic benefits and opportunities which are expected to have very positive impacts for Nisga'a citizens and communities where high unemployment underpins a host of social and economic challenges. There is an appetite for mine-related employment and business opportunities, but a practical recognition that appropriate education, training and experience are key barriers and an underlying scepticism that Nisga'a economic benefits that could or should be available will actually be realized.

Consideration may be given to the extent of the predicted effects of the Brucejack Project in comparison to two other Projects seemingly more relevant to Nisga'a residing on Nisga'a lands: the KSM and the Kitsault projects. KSM is thought to be particularly relevant to Nisga'a due to its large size, while Kitsault is thought of as particularly relevant due to its location in proximity to Nisga'a lands. In comparison, the predicted effects of the Brucejack Project, both positive and negative, are notably smaller in both number and extent.

A major question that underpins the degree to which development will affect Nisga'a communities on the Nass is the potential influx of people and income that would accompany Project development. Nisga'a citizens and their leadership understand that more of both could be enormously beneficial for the future of the Nisga'a villages, not only from the direct benefits of employment income but also from the intangible benefits of being productively occupied, especially for youth. But as this study shows, there are also potential social challenges that can arise from the sudden influx of money, or from pronounced income disparity between those who might secure a high paying mining job and those who do not. These, and other social challenges that could accompany mine development, are not insurmountable problems and, as noted in this report, they can be effectively managed with the appropriate level of commitment and engagement from all parties concerned.

For Nisga'a living outside the Nass Area there is also an interest and incentive to take up mine-related employment, but this would not necessarily involve relocation to Nisga'a communities. Rather, according to the surveys conducted, many Nisga'a would choose to take advantage of the practice of fly-in/fly-out work camps which characterize contemporary mining operations. It will be an ongoing challenge for the Nisga'a villages and government effectively manage this dimension of the modern resource economy in northwest BC.

From this research it is evident that the Nisga'a are well aware that they are in a period of cultural change and transformation. In some respects, with the signing of the NFA the Nisga'a entered a new era of cultural revival. On the other hand, Nisga'a are not immune to the rapid pace of social and cultural change going on around them, none more so than Nisga'a youth. Engaging in the modern, global economy – an opportunity presented by mine development – is a means to social and economic rejuvenation that is not without risk. It also presents some threat to certain dimensions of Nisga'a culture and cultural practice. But managed properly, it may be able to contribute to a cultural renaissance that, as envisioned by some Elders in the focus groups, sees mine development and associated economic benefits underpinning a strengthening of Nisga'a culture and social life.

The Nisga'a have an existing cultural strength that speaks to their ability to adapt to changing circumstances while carrying on their traditions. The development of the Brucejack Gold Mine Project and other regional development projects have the potential to directly result in employment, income and business benefits to the Nisga'a villages, while supporting social and cultural values. The Nisga'a Nation has been preparing for the future in numerous ways (e.g., through training initiatives, housing assessments, and by addressing barriers to educational achievement) and is well-positioned to realize the benefits of development.

REFERENCES

Definitions of the acronyms and abbreviations used in this reference list can be found in the Glossary and Abbreviations section.

2002. *Environmental Assessment Act*, SBC.

2012. *Canadian Environmental Assessment Act, 2012*, SC 2012. C. 19. s. 52.

AANDC. 2010. *Nisga'a Nation Own Source Agreement*. http://www.aadnc-aandc.gc.ca/eng/1100100031751 (accessed February 2012).

Archibald, L. and M. Crnkovich. 1999. *If gender mattered: A case study of Inuit women, land claims and the Voisey's Bay Nickel Project*. Status of Women Canada: Ottawa, ON. http://publications.gc.ca/collections/Collection/SW21-39-1999E.pdf (accessed March 2012).

Avanti. 2011. *Appendix 3.0-J Kitsault Mine Project Traffic Impact Anlaysis June 2011 Update*.

Bascia, N. 2010. *Reducing Class Size: What Do We Know?* The Canadian Education Association. Toronto, ON. http://www.cea-ace.ca/sites/default/files/cea-2010-class-size_0.pdf (accessed November 11, 2013).

BC EAO. 2013. Guideline for the Selection of Valued Components and Assessment of Potential Effects. http://www.eao.gov.bc.ca/pdf/EAO_Valued_Components_Guideline_2013_09_09.pdf (accessed 16 December 2013).

BC Stats. 2011. *Socio-Economic Profiles*. http://www.bcstats.gov.bc.ca/StatisticsBySubject/SocialStatistics/SocioEconomicProfilesIndices/Profiles.aspx (accessed October 2012).

BC Stats. 2013a. *Earnings and Employment Trends*. http://www.bcstats.gov.bc.ca/StatisticsBySubject/LabourIncome/Earnings.aspx (accessed December 2013).

BC Stats. 2013b. Population Extrapolation for Organizational Planning with Less Error (P.E.O.P.L.E). http://www.bcstats.gov.bc.ca/statisticsbysubject/Demography/PopulationProjections.aspx (Sub-Provincial Population Projections - P.E.O.P.L.E. 2013 (Sep 2013) accessed 17 December 2013).

Brockman, A. and M. Argue. 1995. *Review of NWT Diamonds Project Environmental Impact Statement: Socio-economic impacts on women*. Status of Women Council of NWT. http://www.statusofwomen.nt.ca/download/review_BHP.pdf (accessed March 2012).

Brubacher & Associates. 2002. *The Nanisivik Legacy in Arctic Bay: A Socio-Economic Impact Study*. Prepared for the Department of Sustainable Development, Government of Nunavut: Iqaluit, NU.

Brulot, P. 2012. *Reviewing the Options: Report on Community Consultations*. Nisga'a School District 92. http://nnkn.ca/files/SD92%20-%20Report%20on%20Community%20Consultations%20-%20Mar%2019%202012.pdf (accessed November 11, 2104).

CCSG Associates. 2004. *Overburdened: Understanding the impacts of mineral extraction on women's health in mining communities*. MiningWatch Canada. http://www.miningwatch.ca/sites/www.miningwatch.ca/files/Overburdened_0.pdf (accessed March 2012).

George, A. 2011. *How Healthy Are We? Report on the health of the people of the Nisga'a Village of Laxgalts'ap 2011*.

Gibson, G. and J. Klinck. 2005. Canada's Resilient North: The Impact of Mining on Aboriginal Communities. *Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health*, 3 (1): pp. 115-37.

IFC. 2006. *International Finance Corporation's Performance Standards on Social & Environmental Sustainability (Performance Standard 7: Indigenous Peoples)*. International Finance Corporation: n.p.

IISD and Tahltan First Nation. 2003. *Out of Respect: The Tahltan, Mining and the Seven Questions to Sustainability*. Winnipeg, MB; Dease Lake, BC.

InterGroup. 2005. *The impact on families and communities of the fly in/out work rotation system in uranium mines in northern Saskatchewan*. Prepared for the Community Vitality Monitoring and Partnership Program Steering Committee by InterGroup Consultants: n.p.

Jackson, A. and P. Roberts. 2001. *Physical housing conditions and the well-being of children*. Canadian Council of Social Development. http://www.ccsd.ca/pubs/2001/pcc2001/housing.htm (accessed March 2012).

Kuyek, J. and C. Coumans. 2003. *No rock unturned: Revitalizing the economies of mining dependent communities*. MiningWatch Canada. http://www.miningwatch.ca/sites/miningwatch.ca/files/No_Rock_Unturned.pdf (accessed March 2012).

Labrador West Status of Women Council and Femmes Francophone de l'Ouest du Labrador. 2004. *Effects of Mining on Women's Health on Labrador West: Final Report*. http://www.miningwatch.ca/sites/miningwatch.ca/files/Lab_West_Final_Report_en.pdf (accessed August 2012).

MABC. 2014a. *Mining Association of British Columbia*

MABC. 2014b. *Top Careers in Demand in British Columbia*. http://www.mining.bc.ca/education-training/career-options (accessed October 2014).

MIHR. 2008. *British Columbia Report on Labour Market Demand Projections*. http://www.mihr.ca//en/publications/resources/BCReportonLabourMarketDemandProjections.pdf (accessed April 2012).

MIHR. 2011. *Canadian Mining Industry Employment and Hiring Forecasts 2011*. http://www.mihr.ca/en/publications/resources/Employment_HiringForecasts2011_FINALAug4_ENG.pdf (accessed April 2012).

MiHR. 2012. *British Columbia Hiring Requirements and Available Talent Forecasts Exploration, Mining, and Stone, Sand and Gravel*. http://www.mining.bc.ca/sites/default/files/resources/taskforcereport2012.pdf (accessed October 2014).

MITAC. 2005. *Prospecting the Future: Meeting Human Resources Challenges in the Canadian Minerals and Metals Industry*. http://www.mihr.ca//en/publications/resources/FinalReport.pdf (accessed April 2012).

MoEd, B. 2013. *District Report: Nisga'a (92)*. BC Ministry of Education. http://www.bced.gov.bc.ca/reporting/district.php?mode=District&report-school-district=Nisga%27a+SD%23092&district-index=34 (accessed November 11, 2014).

MVEIRB. 2009. *Status Report and Information Circular: Developing Cultural Impact Assessment Guidelines*. Mackenzie Valley Environmental Impact Review Board: Yellowknife, NT.

NAHO. 2008. *Resource Extraction and Aboriginal Communities in Northern Canada: Social Considerations*. National Aboriginal Health Organization: Ottawa, ON.

Nass Area Enterprises Ltd. 2013. *Report to the Community 2013*.

Nisga'a ESICA Fieldtrip. 2014. Gitlaxt'aamiks and Laxgalts'ap, January 21 -24, 2014.

NLG. 2009. *Nisga'a Final Agreement- Implementation Report- 2008-2009*. http://www.nisgaalisims.ca/files/nlg/u3/NLG-AR08-09SinglePages.pdf (accessed October 2012).

NLG. 2010. *Economic, Social, and Cultural Impact Assessment Guidelines*. Nisga'a Lisims Government: New Aiyansh, BC.

NLG. 2013. *Consolidated financial Statements of Nisga'a Lisims Government, March 31, 2013*. http://www.nisgaanation.ca/sites/default/files/Nisga%27a%20Lisims%20Government%20consol%20AR%20March%202013%20%282%29.pdf (accessed October 2013).

NLG, Province of BC, and Government of Canada. 1998. *Nisga'a Final Agreement*. Nisga'a Lisims Government, Province of British Columbia, and Government of Canada: New Aiyansh, BC.

Phipps, S. and L. Lethbridge. 2006. *Income and the Outcomes of Children*. Statistics Canada, Analytical Studies Branch Research Paper Series. http://www.statcan.gc.ca/pub/11f0019m/11f0019m2006281-eng.pdf (accessed March 2012).

Pollen, C. 2011. *B.C. Mining Labour Shortage. BC Business Online. April 4, 2011*. http://www.bcbusinessonline.ca/2011/04/04/crisis-meets-opportunity-bc-mining (accessed August 2012).

Rescan. 2012a. *Kitsault Mine Project: Nisga'a Economic, Social, and Cultural Impacts Assessment Report.* Vancouver BC: Prepared for Avanti Mining Inc. by Rescan Environmental Services Ltd. http://www.ceaa.gc.ca/050/documents/56146/56146E.pdf (accessed 19 December 2013).

Rescan. 2012b. *KSM Project: Nisga'a Social, Economic, Resource Use, and Cultural Survey Statistical Report*. Seabridge Gold Inc.: Vancouver, BC.

SD 92. 2013. *Achievement Contract Between School District No. 92 (Nisga'a) and the Ministry of Education, July 2013*. http://www.bced.gov.bc.ca/schools/sdinfo/acc_contracts/2014/92.pdf (accessed November 11, 2014).

Statistics Canada. 2007. *2006 Census of Canada*. http://www12.statcan.gc.ca/census-recensement/index-eng.cfm (accessed March 2012).

Statistics Canada. 2011. *Labour Force Survey 2011*. Statistics Canada: Ottawa, ON.

Statistics Canada. 2014a. *Table 281-00234. Employment (SEPH), unadjusted for seasonal variation, by type of employee for selected industries classified using the North American Industry Classification System (NAICS) monthly (persons)*. http://www5.statcan.gc.ca/cansim/a26 (accessed October 2014).

Statistics Canada. 2014b. *Table 281- 0026 Average weekly earnings (SEPH), unadjusted for seasonal variation, by type of employee for selected industries classified using the North American Industry Classification System (NAICS) monthly (current dollars)*. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810026&pattern=Earnings+average+industry&tabMode=dataTable&srchLan=-1&p1=1&p2=-1 (accessed October 2014).

TLA. 2014. *British Columbia Coastal Forestry Industry Human Resource Strategy*. March 31, 2014. Prepared for British Columbia Coastal Forest Industry Labour Market Partnership Project Steering Group.

WorkSafeBC. 2012. *Occupational Injuries by Accident Type and Occupation in British Columbia, 2001-2010*. http://www.worksafebc.com/publications/reports/statistics_reports/occupational_injuries/2001-2010/default.asp (accessed August 2012).

Personal Communications

Brulot, P. 2014. Super Intendant. Personal Communication: January 23, 2014.

Gitlaxt'aamiks Village Government. 2014. In attendance: Village Councillors (3), Chief Administrative Officer, Director of Finance, Director of Community Relations, Director of Programs and Services, Housing Coordinator, Director of Operations and Maintenance. Group interview/meeting held in Gitlaxt'aamiks Village Government council chambers: January 22, 2014.

Appendix 1

Nisga'a Socio-economic Setting

APPENDIX 1. NISGA'A SOCIO-ECONOMIC SETTING

This appendix provides selected, socio-economic baseline information relevant to the Nisga'a Economic, Social, and Cultural Impact Assessment. Specifically, information is provided on: housing; community infrastructure; education facilities and services; emergency, health and social services; and social conditions and community well-being in the Nisga'a villages. The information is based on secondary source information and interviews carried out in Gitlaxt'aamiks and Laxgalts'ap in January, 2014.

HOUSING

The Nisga'a villages and village-based housing committees are responsible for all facets of housing including, management, financing, repair and maintenance, renovations, and new construction. Recent updates from interviews with several Nisga'a village government housing administrators confirm that each community has several people or families on the waiting list for new housing. For example, the Gingolx administration states that there are 113 houses in the community and 32 people on the waiting list for new housing, while in Gitwinksihlkw there are about 50 homes with approximately 30 people on the waiting list (Rescan 2012a, 2012b). Gitlaxt'aamiks has 330 homes and five families on the wait list for new housing; however, this figure is somewhat misleading because it only represents the people that have made formal applications for new housing grants to the NLG. Recent community interviews describe Laxgalts'ap as home to 600 people with no vacancy and substantial overcrowding (Nisga'a ESICA Fieldtrip 2014). There are many more people who live in over-crowded conditions with multiple families or three generations under one roof (Gitlaxt'aamiks Village Government pers. comm. 2014).

Development occurs slowly although the barriers to new housing vary between the villages. Cost is a common constraint even once building lots have been redeveloped or new lots provided with services and made available for building. While there are 35 to 40 serviced lots to support new home construction in Gitlaxt'aamiks, the village government has limited budget for the construction of new houses; specifically the Gitlaxta'aamiks government can provide supplementary funding for up to four new houses annually. Even with village government support however, Nisga'a citizens still must raise approximately $150K to $200K (i.e., through a mortgage) to build a relatively modest house. Typically, to obtain supplemental funding for housing, an applicant must have $2,000 and is then eligible to receive a supplement of $47,000 from the NLG once their mortgage application in approved (Gitlaxt'aamiks Village Government pers. comm. 2014).

Most citizens face significant economic barriers that limit their ability to obtain a mortgage or otherwise finance building a house (Gitlaxt'aamiks Village Government pers. comm. 2014). Specifically, many Nisga'a citizens are unable to meet the banks conditions for mortgage approval - namely, the requirement that an applicant demonstrate full-time employment (Gitlaxt'aamiks Village Government pers. comm. 2014). There are also economic and other barriers to the completion of home renovations and major repairs for which there is also demand in the Nisga'a villages (Gitlaxt'aamiks Village Government pers. comm. 2014; Rescan 2012a, 2012b).

In Gitlaxt'aamiks, housing needs include Elders housing, emergency housing, new housing, and renovations (e.g., major, minor renovations, and the slurry program[1]). Updates to Elders homes or the development of a dedicated Elders complex are two approaches that aim to enable Elders to remain in their home communities during old age as opposed to having to relocate to Terrace or elsewhere to reside in an assisted living facility. The development of emergency housing would provide for the victims of domestic violence and the homeless. Major and minor renovations are ongoing and often aim to address issues (e.g., mold, mildew, water damage, and structural damage) that have arisen as a result of poor construction standards (Gitlaxt'aamiks Village Government pers. comm. 2014).

Where the development of new housing is not an option, targeted renovations are undertaken to improve the condition of or expand existing housing units is. Gingolx, for example, is constrained by its geography, flanked by wetlands with steep mountain sides behind and ocean in front. Gingolx has focused on redevelopment of existing lots instead. The cost of redevelopment is about $40,000 to $50,000 per lot. Once a lot has been redeveloped a new home can be constructed. Over the past ten years four new homes have been constructed and the village government is currently reviewing a proposal to develop an 8 to 16 unit apartment complex (Rescan 2012a, 2012b).

It has been almost 20 years since a new home has been built in Gitwinksihlkw (Rescan 2012a, 2012b). As with the other Nisga'a villages, housing supply is a persistent challenge that would be exacerbated by even a small increase in the local population. Previously, the lack of new home building was attributed to infrastructure constraints such as the limitations of the village water supply system. Recently the water system was upgraded and a large home renovation program completed with support from the Canadian Economic Action Plan. The Gitwinksihlkw Government has applied for funding to renovate five additional homes through the Canada Mortgage and Housing Corporation's Residential Rehabilitation Assistance Program. Three of the five requests have been conditionally approved and the Gitwinksihlkw housing department will continue to pursue funds for future renovations (Rescan 2012a, 2012b).

Laxgalts'ap faces housing challenges similar to its counterparts with little to no vacancy and common over-crowding. A large portion of the housing, built by the Department of Indian and Northern Affairs (DIAND; now Aboriginal Affairs and Northern Development Canada, AANDC) in the 1960s and '70s is of very low quality and in need of substantial repairs and renovations (Laxgalts'ap Village Government pers. comm. January 23, 2014). There are new, serviced building lots awaiting construction but few residents are able to raise sufficient funds to build, even with receipt of an NLG housing grant. NLG and the village governments are, however, in the midst of implementing fee simple property ownership on Nisga'a Lands under provisions of the Nisga'a Final Agreement (NFA). It is hoped that this ability to own property outright will enable Nisga'a citizens to use it as collateral to facilitate financing new home construction (Gitlaxt'aamiks Village Government pers. comm. 2014; Laxgalts'ap Village Government pers. comm. January 23, 2014).

[1] The slurry program is currently underway and involves ensuring all Village housing units have concrete basements.

COMMUNITY INFRASTRUCTURE

The NLG and the individual Nisga'a village governments are responsible for the provision of community utilities, infrastructure and services including water, sewer, and garbage disposal and recycling on Nisga'a Lands. All forms of water-use, including domestic, industrial, and agricultural, are sourced from a water reservation (Rescan 2012a, 2012b). The communities' landfill is located near Gitlaxt'aamiks and provides services to the Nisga'a villages and surrounding areas. The Regional District of Kitimat-Stikine contributes financially to its operation, but is not involved in providing these services (NLG 2011). All the Nisga'a villages are connected to the provincial electricity grid.

The water and sewer systems in Gitlaxt'aamiks were established in 1963. As one village government official put it, "infrastructure is often the first thing to be built when a community is being established, but after that it is ignored and it is very hard to get funds for upgrades or expansion even when the system gets old" and the community grows beyond its original capacity (Gitlaxt'aamiks Village Government, pers. comm. January 22, 2014). In Gitlaxt'aamiks the sewer system has been expanded from one to three lagoons, but these are at capacity and in need of additional aeration infrastructure in order to keep functioning properly (Gitlaxt'aamiks Village Government, pers. comm. January 22, 2014). The water system draws water from a glacier behind the community and has a large filtration system, but it too is reportedly at capacity largely due to the village's growth in both population and in the number of large, newly constructed public buildings since the NFA came in to effect (Gitlaxt'aamiks Village Government, pers. comm. January 22, 2014). Furthermore, recent housing development on some of the community's higher ground have encountered problems with low water pressure adding to the need for water system infrastructure investment (Rescan 2012a, 2012b).

The water and sewer systems in Gingolx were developed when the community was established. Both systems have received upgrades which were completed in late 2011, and are believed to be sufficient to meet needs. Community water is obtained from a reservoir (Rescan 2012a, 2012b).

The Village of Gitwinksihlkw has received a new water system that draws community water from the Nass River. Construction and building of the new system took place over two years and was completed in March 2012. The water system has a large capacity and includes an advanced filtration system. The sewer system in Gitwinksihlkw was established in the 1980s and does not need to be upgraded at this time. The sewer system includes one lagoon located on the flats, approximately 300 m from the last house in the village. The sewer system is described as being in good condition (Rescan 2012a, 2012b).

The Laxgalts'ap water system obtains water for homes from nearby glacial runoff. The high quality of water in Laxgalts'ap has prompted local entrepreneurs to pursue a business plan to bottle and sell the communities water (Nisga'a ESICA Fieldtrip 2014). Each of the Nisga'a villages has a recreation centre with a gymnasium and various activity rooms. Nisga'a Child and Family Services provide resources for community-based recreation programs (NLG, Province of BC, and Government of Canada 2009). Recreation opportunities at the Nisga'a Memorial Lava Bed Provincial Park (Anhluut'ukwsim Laxmihl Angwinga'asanaskwhl) include canoeing, cycling, fishing, hiking, hunting, swimming, and snowmobiling (BC Parks 2011). The Nisga'a Memorial Lava Bed Park is the

first BC Provincial Park to be managed jointly by the province and an Aboriginal group. It includes a 16-site vehicle campground, picnic areas, a visitor information centre, boat launches, and hiking trails (NLG, Province of BC, and Government of Canada 1998, 2009; BC Parks 2011). Respondents in the youth focus group interviews conducted in 2012 highlighted the lack of recreation and youth oriented facilities in the villages and noted the linkages between high youth unemployment, idleness, and lack of recreation opportunities (Rescan 2012a, 2012b). This sentiment was echoed in recent meetings in Gitlaxt'aamiks; "the community could really use another ball field…[because] community sports help to build community and the one we have is in high demand" (Gitlaxt'aamiks Village Government, pers. comm. January 22, 2014).

EDUCATION FACILITIES AND SERVICES

Education services in the Nisga'a villages are provided by Nisga'a Nation School District No. 92, which is part of BC's publicly funded school system. In 2012 the school district implemented a restructuring program that reduced the number of multi-grade classes and created a middle school. The restructuring was the outcome of an extended community consultation process. It was driven by new leadership tasked with improving education attainment in SD 92 where students have consistently been at the bottom of provincial rankings for many years (Nisga'a School District No. 92: pers. comm. January 23, 2014). The main challenge for parents and students is the necessity for some younger students to have to travel by bus to a different community to go to school now, whereas in the past students remained at school in their home community until grade 8 (Nisga'a School District No. 92: pers. comm. January 23, 2014). In addition to the four public schools there is also adult and continuing education facilities and services available at the Wilp Wilxo'oskwhl Nisga'a Institute located in Gitwinksihlkw.

Nisga'a School District No. 92 employed 32 teachers for the 2011/2012 school year, including three in Gitwinksihlkw, five in Laxgalts'ap, three in Gingolx, and 21 in Gitlaxt'aamiks. The four schools in the school district have experienced a steady decline in enrolment over the past several years.[2] In September 2010, there were 422 students from Kindergarten to Grade 12, including 46 students in the smallest elementary school and 241 students in the combined elementary/secondary school in the largest community. Forty-four students were designated as special needs and approximately half the students (212) were receiving English Language Development programs and services in 2010 (Nisga'a School District No. 92 2011). In September 2011, there were 392 students, with a high portion of those students at the high school level (Rescan 2012a, 2012b).

The Gingolx Child Care Facility is a 24-space facility that provides programming for infants as well as school-aged children along with cultural activities and language learning opportunities for other ages. The centre was a joint project funded by the Ministry of Children and Family Development and Village of Gingolx (Education 2012).

The SERC Survey (Rescan 2012b, 2012a) found that educational attainment, measured by the number of students completing their high school diploma, is significantly higher among Nisga'a citizens living in the Nisga'a villages than it is with those living off Nisga'a lands.

[2] There was a 21% decline in student enrolment between 2006/07 and 2010 (BC Ministry of Education [BC MOE] 2010)

EMERGENCY, HEALTH, AND SOCIAL SERVICES

Emergency services in the Nisga'a communities are comprised of the Gitlaxt'aamiks Volunteer Fire Department and an RCMP Lisims/Nass Valley police detachment both located in Gitlaxt'aamiks.[3] Ambulance services in the Nisga'a villages are provided by the BC Ambulance Service for the northern region, and the Nisga'a Valley Health Authority (NVHA) operates an emergency phone service and manages healthcare services and delivery in the Nisga'a villages via the main centre in Gitlaxt'aamiks and satellite clinics in the other Nisga'a villages (NVHA 2014). For more complex, long-term care and services for social and health conditions the nearest full-service hospital is the Mills Memorial Hospital in Terrace. A study conducted in 2011 (George 2011) with Laxgalts'ap residents, identified a number of barriers Nisga'a face in accessing health care services including, for example, long waiting lists, lack of doctors in the area, and difficulties in arranging for transportation to nearest health service center. As is the case for many smaller Aboriginal communities, the availability of health care services often fluctuates.

The NVHA manages the delivery of physician services, public health, dental, and mental health services. There are six doctors on staff working shifts with three doctors at a time on a six week rotation. In addition, there are eight nurses responsible for a number of services ranging from community and public health to home care and treatment. Other local health services include dental clinics, home support and residence care, cultural and community health, mental health and wellness, and youth enrichment (NVHA 2014).

The Nisga'a Village governments each have a social services or development department intended to provide or manage a range of programs including: basic and special needs, home care for seniors and/or disabled, training and education support, domestic violence prevention, and support services (NLG 2011; Rescan 2012a, 2012b). Nisga'a Child and Family Services have offices in Gitlaxt'aamiks, Terrace, and Prince Rupert. It has a mandate to support a range of services to help ensure protection and well-being of Nisga'a children and youth. Nisga'a Child and Family Services coordinate and provide services in compliance with the child welfare statues as well as broader, non-statutory services delivered through community volunteers. The NLG continues to broaden and strengthen the range and delivery of numerous other social services, community health, and well-being initiatives, including ongoing efforts to fund and build local capacity for local services (NLG, Province of BC, and Government of Canada 2009).

SOCIAL CONDITIONS AND COMMUNITY WELL-BEING

Aboriginal peoples have generally not received substantial social and economic benefits often associated with mining and other natural resource extraction industries, despite the fact that they are often the communities most closely situated to resource development projects (Fidler 2008) (Sullivan Roud Table 2002).

The Aboriginal Affairs Working Group (HRDC 2012) has identified education, economic development, and health as key indicators of Aboriginal well-being in Canada. Based on Statistics

[3] The police detachment includes one corporal, five constables, 1.5 public servants [sic], and one victim assistance program manager.

Canada's 2006 Census of Canada and Regional Health Surveys, notable gaps remain between the Aboriginal and non-Aboriginal populations for each of these indicators. In recent years it has been widely reported that the social well-being of Aboriginal peoples falls below that of Canadian society in general according to indicators of poverty, educational attainment, health and social issues (White, D. Beavon, and N. Spence 2008). In BC, levels of employment, income, and educational attainment among Aboriginal peoples is approximately 80% of that of other BC residents (Vancouver Coastal Health 2012).

BC Stats reports social and economic data on children at risk, youth at risk, human economic hardship, crime, health and education in Local Health Areas (LHAs). The children at risk indicators include infant mortality rate, the rate of children in care, the percentage of children below standard reading levels, and percentage of children receiving income assistance (BC Stats 2012). The rate of children in care for the Nisga'a LHA was more than three times the provincial rate (Table 1).[4] The percentage of students falling below provincial reading standards in the Nisga'a LHA was also just over three times the provincial average (Table 1). Participants in the 2012 Nisga'a focus groups indicated that many Nisga'a parents believed their children were not receiving an education on par with other parts of the province. Focus group participants perceived differences between Nisga'a village schools and schools in Terrace or Vancouver. The Nisga'a LHA was ranked 78th out of 78 LHAs for reading standards and 77th for the rate of children in care (BC Stats 2012).

Table 1. Children at Risk Indicator by Local Health Area

Location	Infant Mortality Rate[1] (number/1,000)	Rate of Children in Care[2] (number/1,000)	Below Standard Reading (Grades 4 and 7)[3] (%)	Children Aged 0-18 Years Receiving Income Assistance[4]	
				<1 Year (%)	>1 Year (%)
Nisga'a LHA	X	34.6	65.3	X	X
Terrace	4.0	16.4	24.8	3.2	4.5
British Columbia	3.9	9.4	20.5	1.1	1.7

Source: (BC Stats 2012).
Notes:
[1] Number of deaths of children under one year old per 1,000 births , average for 2005 to 2009.
[2] Number of children taken into custody per 1,000 population aged 0 to 18 years, as of December 2009.
[3] Below standard reading (grades 4 and 7) is the percentage of students taking exams that scored below standard average for 2007/2008 and 2008/2009.
[4] Percentage of population aged 0 to 18 years receiving income assistance for less than a year and percentage of population aged 0 to 18 years receiving income assistance for more than a year.
X - data suppressed.

Youth at risk is measured by the percentage of young adults receiving social assistance, the percentage of young adults who did not graduate, and the serious crime rate by juveniles (BC Stats

[4] Caution should be used in comparing percentages or rates between very small and very large populations because the incremental effect of a single incident in a smaller population is larger than it would be for a larger population. The effect exaggerates the difference between the two populations. For example, one additional serious crime in a Nisga'a Village would increase the rate per thousand from 25 to 25.53, whereas at the provincial scale the addition of a single serious crime would increase the serious crime rate from 10 to 10.0002.

2012). Data for the percentage of young adults receiving income assistance was not available for the Nisga'a LHA. The percentage of young Nisga'a adults who did not graduate was higher than both Terrace and British Columbia (Table 2). An analysis of health indicators in northern BC indicated the Nisga'a LHA had the highest number of teenage pregnancies at 138.1 per 1,000 women aged 15 to 19, more than double, and in a few cases triple, the number of teenage pregnancies in other LHAs. For example, the provincial average is 26.3/1,000, the northern rate is 51.1, the rate in Terrace is 60.9, and the rate for Smithers is 32.1 (Kashaninia 2011). High incidence of teenage pregnancy is linked to lower rates of completion of high school as young mothers, of necessity or choice, elect to stay home for a period of time after giving birth while young fathers may feel compelled to seek employment to provide for their family. The percentage of serious crime by juveniles in the Nisga'a communities was not quite double that of Terrace, but was two and a half times the provincial rate. Nisga'a LHA was ranked 75th for serious crime rates and 72nd for percentage who did not graduate (BC Stats 2012).

Table 2. Indicators of Youth at Risk by Local Health Area

LHA	Young Adults Aged 19 to 24 Years Receiving Income Assistance[1]		Young Adults Aged 18 Years Who Did Not Graduate[2] (%)	Serious Crime Rates by Juveniles Aged 12 to 17 Years (number/1,000)
	Total (%)	>1 Year (%)		
Nisga'a	X	X	49.8	25.0
Terrace	4.2	2.3	44.6	14.4
British Columbia	1.6	0.5	29.8	10.2

Source: (BC Stats 2012)
Notes:
[1] As of September 2009.
[2] Average for 2007/2008 and 2008/2009.
[3] Average for 2006 to 2008.
X – data supressed.

Indicators of economic hardship include the percentage of the population receiving income assistance and the percentage of seniors receiving maximum income support. The percentage of the population receiving income assistance was slightly higher in the Nisga'a LHA compared to Terrace, and was approximately three times the provincial rate. The Nisga'a LHA ranks last in the province among the 78 local health areas in terms of the percentage of seniors receiving maximum income support, five times higher than Terrace (Table 3; BC Stats 2012).

In BC the percentage of the Aboriginal population who are seniors or Elders at 4% is well below that of the general population of BC at 13.3% (BC Ministry of Health Services 2004). However, according to recent interviews the number of Elders in the Nisga'a villages is on the rise. Seniors housing and care is an emerging priority for Nisga'a village and central governments (Gitlaxt'aamiks Village Government pers. comm. 2014). A site for a dedicated Elders' housing complex has been identified and awaits appropriate approvals and financing to proceed (Gitlaxt'aamiks Village Government pers. comm. 2014).

Table 3. Indicators of Economic Hardship, by Local Health Area

LHA	Population Aged 0 to 64 Years On Income Assistance[1]			Rate of Seniors Receiving Maximum IS[2] (number/1,000)
	Total (%)	>1 Year (%)	>1 Year (%)	
Nisga'a	6.2	X	X	11.8
Terrace	5.1	2.1	3.0	2.3
British Columbia	1.9	0.7	1.3	3.1

Source: (BC Stats 2012)
Notes:
[1] As of September 2009.
[2] As of December 2009 (number per 1,000 population).
X – data is supressed.
IS – Income Support.

Crime indicators include total serious crime, serious crimes per police officer, property crime and violent crime (BC Stats 2012). In the Nisga'a LHA crime rates are substantially higher than provincial rates, particularly for serious crimes. The total serious crime rate in the Nisga'a LHA was nearly double the provincial (Table 4). The number of serious crimes per police officer in the Nisga'a LHA was slightly higher than the rates in Terrace and BC. The Nisga'a LHA ranked 78th for violent crime rates, 75th for property crime rates, and 70th for serious crimes per police officer for 2009. The Nisga'a LHA was ranked 77th of the 78 provincial LHAs for number of serious crimes per police officer (BC Stats 2012).

Table 4. Indicators of Crime, by Local Health Area

LHA	Violent Crime Rate (number/1,000)	Property Crime Rate (number/1,000)	Total Serious Crime Rate (number/1,000)	Serious Crime Rate (number/Police Officer)
Nisga'a	9.3	15.7	25	11.9
Terrace	4.5	9.8	14.4	8.0
British Columbia	3.5	10	13.5	9.4

Source: (BC Stats 2012).

Life expectancy at birth and potential years of life lost (PYLL) from natural and accidental causes, suicides and homicide are used as indicators of the health of a population (BC Stats 2012). Table 5 shows life expectancy in the Nisga'a LHA to be about seven and a half years shorter than for the province as a whole. In the Nisga'a LHA, the PYLL from natural causes is 20 years higher than the provincial rate. PYLL from suicide/homicide in the Nisga'a LHA was also considerably higher than the provincial average. The Nisga'a LHA ranked 78th for life expectancy and PYLL from suicide/ homicide, 70th for death from natural causes, and 28th in terms of death from accidental causes for 2009. Overall, the Nisga'a LHA was rated 72nd of all 78 LHAs for health problems (BC Stats 2012).

Table 5. Indicators of Health Problems, by Local Health Area

LHA	Life Expectancy At Birth[1] (Years)	Potential Years of Life Lost[2]		
		Natural Causes (number/1,000)	Accidental Causes (number/1,000)	Suicides/Homicides (number/1,000)
Nisga'a	73.8	53.5	8.7	32.6
Terrace	78.0	47.0	13.1	6.2
British Columbia	81.4	33.4	7.5	3.8

Source: (BC Stats 2012)
Notes:
1 Average for 2005 to 2009.
2 Average for 2004 to 2008 (number per 1,000 population).

As measured by the above indicators, community well-being in the Nisga'a villages is below that of other communities or is lower than the provincial average. This is, of course, part of the story, but the numbers are likely to hide important context or details of local perceptions and understandings of well-being. The focus groups and SERC Survey (Rescan 2012a, 2012b) provide additional information and different perspectives on social conditions in the Nisga'a villages and among Nisga'a people in general.

REFERENCES

BC Parks. 2011. *Anhluut'ukwsim Laxmihl Angwinga'asanaskwhl Nisga'a Provincial Park* http://www.env.gov.bc.ca/bcparks/explore/parkpgs/nisgaa/ (accessed Febraury 3, 2014).

BC Stats. 2012. *Socio-Economic Profile: Local Health Area 92 - Nisga'a*. BC Stats. http://www.bcstats.gov.bc.ca/StatisticsBySubject/SocialStatistics/SocioEconomicProfilesIndices/Profiles.aspx (accessed October 30, 2013).

Education, B. M. o. 2012. Aboriginal Report 2007/08 - 2011/12: How Are We Doing?: School District 092 Nisga'a. 46.

Fidler, C. R. 2008. Aboriginal Participation in Mineral Development: Environmental Assessment and Impact Benefit Agreements. MSc diss., University of British Columbia, Faculty of Graduate Studies (Mining Engineering).

George, A. 2011. *How Healthy Are We? Report on the health of the people of the Nisga'a Village of Laxgalts'ap 2011*.

HRDC. 2012. *Indicators of Well-being in Canada*. Human Resources and Development Canada. http://www4.hrsdc.gc.ca/h.4m.2@-eng.jsp (accessed March 11, 2012).

Kashaninia, Z. 2011. *Infoline report: Education and Health - A Regional Analysis of British Columbia: Part 5 - Northern Health*. BC Stats: Victoria, BC.

Nisga'a ESICA Fieldtrip. 2014. Gitlaxt'aamiks and Laxgalts'ap, January 21 -24, 2014.

NLG. 2011. *Consolidated Financial Statements of Nisga'a Lisms Government*. http://www.nisgaalisims.ca/files/nlg/Audit.pdf (accessed October 2012).

NLG, Province of BC, and Government of Canada. 1998. *Nisga'a Final Agreement*. Nisga'a Lisims Government, Province of British Columbia, and Government of Canada: New Aiyansh, BC.

NLG, Province of BC, and Government of Canada. 2009. *Nisga'a Final Agreement Implementation Report 2008-2009*. Nisga'a Lisims Government, the Province of British Columbia, and the Government of Canada: New Aiyansh, BC; Victoria, BC; and Ottawa, ON.

NVHA. 2014. *Clinical Services*. Nisga'a Valley Health Authority. https://sites.google.com/a/nvha.ca/main/clinical-operations (accessed Febraury 24, 2014).

Rescan. 2012a. *Kitsault Mine Project: Nisga'a Economic, Social, and Cultural Impacts Assessment Report.* Vancouver BC: Prepared for Avanti Mining Inc. by Rescan Environmental Services Ltd. http://www.ceaa.gc.ca/050/documents/56146/56146E.pdf (accessed 19 December 2013).

Rescan. 2012b. *KSM Project: Nisga'a Social, Economic, Resource Use, and Cultural Survey Statistical Report*. Seabridge Gold Inc.: Vancouver, BC.

Sullivan Roud Table. 2002. *The Sullivan Round Table: Lessons in Sustainability*. D. R. Parker and C. J. Rockandel, Eds. Kimberely, BC: Teck Cominco and the World Bank.

Vancouver Coastal Health. 2012. *Aboriginal Health: Aboriginal Health Facts*. Vancouver Coastal Health Authority. http://aboriginalhealth.vch.ca/facts.htm (accessed March 5, 2012).

White, J. P., D. Beavon, and N. Spence. 2008. *Aboriginal Well-being: Canada's Continuing Challenge*. Thompson Educational Publishing: Toronto, ON.

Personal Communications

Gitlaxt'aamiks Village Government. In attendance: Village Councillors (3), Chief Administrative Officer, Director of Finance, Director of Community Relations, Director of Programs and Services, Housing Coordinator, Director of Operations and Maintenance. Group interview/meeting held in Gitlaxt'aamiks Village Government council chambers: January 22, 2014.

Laxgalts'ap Village Government. Village Councillors (2), elder and clan sub-chief, and Council of Elders co-chair. Group interview/meeting held in Laxgalts'ap Village Government council chambers: January 23, 2014.

Nisga'a School District No. 92. Joint meeting/interview with District Superintendent and Director of Operations. Held in district head office, Gitlaxt'aamiks: January 23, 2014

Appendix 2

First Nations and Mining Operations in British Columbia

APPENDIX 2. FIRST NATIONS AND MINING OPERATIONS IN BRITISH COLUMBIA

The purpose of this appendix to the Brucejack Gold Mine Project Nisga'a Economic, Social, and Cultural Impact Assessment is to focus on First Nations' contemporary experience with mineral exploration and mining development in British Columbia (BC).

In BC, First Nations exposure to mining activities, within or adjacent to their traditional territories, is approaching 200 years in duration (Wilson 2008). The history of impacts and benefits of mineral development in BC is complex. The experience of most Aboriginal communities in BC with mining in or near their traditional territories has been both positive and negative. In light of these experiences, Aboriginal communities, by and large, remain open to the prospect of mining development within their traditional territories provided that they are given meaningful opportunity to participate in the planning of such projects, have some role in assuring the environmental sustainability of such projects, and are able to participate in the jobs and other economic opportunities (PPF 2006; Fidler 2008).

Recent work has illuminated a number of emergent mechanisms and tools for facilitating First Nations' participation in and benefit from the mining sector, such as the consultation process (Wilson 2008; IHRC 2010), corporate social responsibility (Heisler 2013; Heisler and Markey 2013), and Impact and Benefit Agreements (IBAs) or similar negotiated agreements or arrangements (Sosa and Keenan 2001; PPF 2006; NDMF 2013). Consultation aims to bring to the fore key issues and concerns that First Nations have about a development, in particular to identify where and how such development might impinge on Aboriginal rights and title, and to work towards ways of addressing those concerns. Ideally, consultation should reduce certain risks for project developers, ensure government fulfils its constitutional and legal duty, and ensure that Aboriginal interests are not harmed and that their communities and people might also benefit from development.

First Nations, and increasingly government agencies including the BC EAO, maintain that it is preferable for consultation to begin as early in the exploration phase as possible (EAO 2013). However, consultation can be faced with a number of obstacles. Some companies may lack the dedicated expertise, resources or commitment to undertake meaningful consultation. For those companies that have capacity to consult with First Nations, their efforts can be constrained by First Nations' lack of capacity for reciprocal engagement. As the number of claims increase and more and more companies undertake development-related activities, First Nations can be inundated with referrals and other requests for input and comment on proposed mineral activity in their traditional territories (Heisler 2013; Heisler and Markey 2013). Many First Nations in BC simply do not have sufficient numbers of people with the necessary technical training and experience to review documents and identify key issues of concern or importance to their community.

As a project progresses through the approval process challenges and uncertainties arise for both proponents and Aboriginal communities. In BC, the large number of First Nations, many with overlapping traditional territories, unsettled land claims and multiple related issues pertaining to

the exercise and protection of Aboriginal rights and title, adds to the complexity and risks of investing and developing mining projects in the province (Wilson 2008; IHRC 2010; Nelsen, Malcolm, and Ostry 2010; Sketchley 2012; Heisler 2013). Compounding the issue, there are challenges associated with consistently applying the duty to consult and other aspects of Aboriginal rights and title. For proponents often dependent on global financial markets to provide the capital for their projects, these risks and uncertainties can have direct effects on the availability of financial resources necessary to continue through the approval process if the risks and uncertainties lead to delays in reaching key milestones (Nelsen, Malcolm, and Ostry 2010; Sketchley 2012). For First Nations, there is the persistent tension between the need for jobs and the desire to build sustainable local economies and the cultural (and economic) imperative of protecting their traditional territories and resources (Fidler 2008; Heisler 2013).

Companies are often being encouraged (implicitly or explicitly) to forge arrangements directly with First Nations. While this is quite common across the country (Sosa and Keenan 2001; NDMF 2013), in BC there appears to be a surge in both the number and types of agreements being reached between mining proponents and the First Nations on whose territory they are seeking to operate (NDMF 2013). These arrangements fill some of the procedural elements of governments' duty to consult and help reduce risks associated with project delays or inadequate consideration of Aboriginal rights and interests. For First Nations these agreements provide an opportunity to work directly with proponents to seek assurances and commitments around the potential socio-economic opportunities and benefits for their communities, and to have a voice in other aspects of project planning and implementation.

While there are a number of examples where communities do not enter into a formalized agreement with a project or proponent, overall there is a general trend towards some form of negotiated, bilateral agreement with Aboriginal communities (Heisler 2013; NDMF 2013). Whether called Memoranda of Understanding, Participation Agreements, Interim Measures Agreements, or IBAs, there are no set rules or requirements as to what such agreements should or should not contain (NDMF 2013). They can range from a straightforward commitment to provide funding to support Aboriginal participation in the assessment process (often called a capacity funding agreement) to a complex and binding IBA that sets out detailed provisions for training and employment, economic development and business opportunities, and even financial or equity provisions for First Nations communities and members (Sosa and Keenan 2001; PPF 2006; Merit Mining Corporation 2008). Some specific examples of recent First Nations' experience with mining and these sorts of agreements are provided below.

Tahltan First Nation Experience with Mining

The Tahltan First Nation has a lengthy history of experience with mining. Historically Tahltan members worked at the asbestos mining town of Cassiar, which operated for over forty years until finally closing in 1992 (Simpson 2003; Fidler 2008; Daum 2013). During the 1990s, Tahltan Nation involvement with the Eskay Creek Mine was the outcome of a negotiated agreement between the Tahltan Central Council and the original mine operator, Homestake Mining Company, later acquired by Barrick Gold Corporation. Features of the agreement included a commitment on behalf of the proponent to employ Tahltan workers and to award the First Nation's independent business arm, the Tahltan Nation Development Corporation (TNDC), various catering, maintenance and

service contracts including a $1 million per year road maintenance contract for the Eskay Creek Mine access road (Heisler 2013). Although it is not entirely clear from available sources, it appears that the commitment was to hire approximately one third of the mine's operations workforce from the Tahltan Nation, which was met and in some years exceeded (Barrick Gold Inc. 2003; IISD 2004). At the closure of the Eskay Creek Mine the TNDC wrote an open letter praising Barrick Gold and highlighting the positive outcomes of, "building relationships based on the principles of honesty and transparency" and the company's commitment to building mining and business capacity within the Tahltan Nation (Barrick Gold Inc. 2009).

Subsequently, the Tahltan Nation has negotiated a Participation Agreement with NovaGold Canada Inc. for the Galore Creek Project. The agreement, signed in 2006, covers access to business opportunities including the supply of goods and services, mutual cooperation for an environmental review and permitting process, training and employment benefits, other financial contributions to the Tahltan Heritage Trust Fund, and recognition of Tahltan rights and title. In return the Tahltan agreed to support the project and NovaGold's rights to explore and develop mineral resources in the project area (NovaGold Canada Inc. and Tahltan Central Council 2006). To date the substance of this agreement has not been tested as the project has been on hold since 2007.

The Tahltan take a very proactive stance with respect to mining within their traditional territory (IISD 2004). They are neither wholly in support of, nor wholly against, mining development in general but take a project-by-project approach. It appears that much depends upon the physical location of a proposed project in relation to areas of cultural and environmental importance to Tahltan and to the level of trust and quality of the relationship with project proponents. The Red Chris Mine, now under construction, is a case in point of the complexities of the relationship between proponents and First Nations. Although a Memorandum of Understanding (MOU) was signed in 2004 between the proponent and the Tahltan Nation, the current leadership does not endorse the agreement and maintains that the relationship with the Red Chris Development Corporation is still developing (TCC n.d.). The Tahltan expressed considerable opposition to the project as it moved through the environmental assessment process (Nation Talk 2012). Subsequent to approval of the project and commencement of construction, TNDC contractors have obtained work in construction and support services (CTV 2012) and the TCC is in negotiations with the proponent to sign an IBA (McPhee 2013; TCC n.d.).

In 2013, the Tahltan Nation and the Government of BC entered into a Shared Decision Making Agreement with the overarching goal of fostering, "an effective, respectful, and enduring government-to-government relationship" (Tahltan Nation and Province of British Columbia 2013: 7). The agreement is meant as a tangible step in the implementation of the Transformative Change Accord, part of the government's New Relationship Policy. Some objectives of the agreement are to increase governance capacity for Tahltan to participate in resource management planning, to increase opportunities for Tahltan to benefit from future resource development with their traditional territory, and to increase certainty for resource investment, land and resource use, and Tahltan traditional uses (Tahltan Nation and Province of British Columbia 2013). The agreement also includes commitments to negotiate sharing of revenues and benefits generated from lands and resources within Tahltan Territory. The agreement is expected to provide a framework for future

resource development projects within Tahltan Territory (Tahltan Nation and Province of British Columbia 2013).

Takla First Nation Experience with Mining

The Takla First Nation in north central BC also has a depth of experience with mining on their traditional territory, including experience with now abandoned historical mines such as the Bralorne-Takla mercury mine, which operated around the middle of the last century. The experience of the Takla First Nation with consultation efforts by different proponents, especially during exploration stages of development, has been quite varied (IHRC 2010). While Serengeti resources won qualified praise from Takla representatives for early and ongoing consultation, some prospecting and exploration activities have taken place on their traditional territories for extended periods without the knowledge of the Takla Nation (IHRC 2010).

The Takla have a number of documented concerns during the operational phases of mines in their traditional territory as well. The Kemess South mine operated from 1998 to 2011 in the northern part of the Takla Nation's traditional territory. Interviews documented in a recent report by IHRC (2010) indicate concerns about various effects to traditional food supplies such as wildlife and fish. Perceived causes are linked to various sources of disruption such as noise from operations, mine transportation, and possibly environmental contamination, although the latter is attributed more to historical operations (IHRC 2010). The mine's previous owner, Northgate Mines, signed a Financial Compensation Agreement with the Takla Nation and two other neighbouring First Nations in 2006; however, band members were critical of the agreement on a number of levels. First, the agreement was not retroactive to the approximately 19 years for which exploration and mining activities were occurring on Takla traditional territory prior to the agreement. However, ownership of the property had changed throughout this period, and Northgate Mines – the proponent signing the agreement – had only owned the property for six years prior to the agreement. Second, the amount offered in the agreement was perceived to be relatively small when divided among three First Nations, which is a common challenge associated with competing land claims between First Nations for portions of the same traditional territories. Third, interviewees perceived the agreement to be more of a unilateral offer from the proponent to "buy" the community's cooperation, rather than a genuine attempt to negotiate or mutually address issues and concerns (IHRC 2010). Another challenge for Takla Nation members from their experience with Kemess South has been the sporadic nature of mine employment as noted by one interviewee in the IHRC study, "There's no economy. We just finish a job and move to another job. Today log building, next year drilling, next year logging, next year prospecting—some other short-term project." (IHRC 2010: 155). These types of concerns are related to the nature of seasonal employment for both First Nations and non-First Nations engaged in resource sector industries. However, these types of concerns are less apparent once mines are producing than during exploration phases or when compared to employment in forestry activities.

The Takla Nation was involved in the approval process undertaken for the proposed Kemess North Project, which was the subject of a Joint Review Panel process. The Panel was convened in 2005 and included a series of public hearings during which the Takla and other First Nations expressed strong opposition to the project, in particular, the proposed use of a culturally important lake as a tailings pond for the mine (Kemess North Mine Joint Review Panel 2007). The project was ultimately not recommended for approval.

Subsequently, a new proposal to develop the same deposit as an underground mine has been put forward by Aurico Gold which acquired the Kemess South operation and adjacent mineral claims in 2011. The proponent has been actively consulting the three First Nations whose traditional territory overlaps the proposed project area. Under an umbrella group identified as the Tse Key Nay, the Takla First Nation has joined forces with the Kwadacha and the Tsay Key Dene First Nations to represent their collective interests and negotiate directly with Aurico Gold. A series of meetings between Aurico Gold and Tse Keh Nay culminated in an Interim Measures Agreement (IMA) signed in June 2012 (SRK Consulting Inc. 2012).

The IMA includes cash payments and other provisions to help facilitate Tse Key Nay's ongoing participation and engagement during the permitting and advanced exploration stages of the project. Specifically it is intended to address, "a variety of topics including project permitting, environmental studies, business opportunities, and employment and training opportunities" (IHRC 2010). AuRico has established a Senior Implementation Committee comprised of representatives from AuRico and Tse Keh Nay to execute initiatives outlined in the IMA including the establishment of an Environmental Management Committee (EMC). The EMC has the mandate to identify key issues and information needs related to Tse Keh Nay interests and the environmental assessment process. To date the EMC has overseen the completion of a caribou tracking study and an archaeological overview assessment (AuRico Gold 2012). The IMA also includes provisions to negotiate and institute a new agreement with trapline holders, some of whom criticized the previous agreement with Northgate Minerals, which, they argued, under-valued their traplines (IHRC 2010).

The Takla Nation is becoming increasingly sophisticated in their approach, aiming at finding ways to ensure that their communities benefit from mineral development while at the same time protecting key interests related to their Aboriginal rights and title. Once again, it also appears that an industry partner that understands and is committed to meaningful consultation is a key element in the process. Another key element may be the representation of group interests through a corporation, such as TNDC, or umbrella organization such as Tse Keh Nay, which can provide a stronger, formalized basis for the representation of First Nations interests (Sosa and Keenan 2001; NDMF 2013).

Other First Nations' Experiences and Agreements with British Columbia

Under BC's New Relationship policy with First Nations introduced in 2005, the province became the first jurisdiction in Canada to share direct mining-related revenue collected under the *Mineral Tenure Act* (1996) with First Nations. Revenue sharing applies to new mines or major mine expansions only and is negotiated on a project-by-project basis under terms of an Economic and Community Development Agreement (ECDA) (NDMF 2013). To date there are approximately eight such agreements, most of which came in to effect in 2013 (Government of British Columbia 2013).

Besides the formula for sharing revenue, terms under the ECDA may extend to other areas such as commitments to minimize impacts to Aboriginal interests and to provide accommodation where impacts do occur. This is apparent in the Williams Lake and Soda Creek agreements, which include provisions for minimizing impacts arising from the operation of the Mount Pelley mine (Government of British Columbia 2013). Additionally, ECDAs may provide broad commitment for resource sharing. Such is the case for the Ktunaxa Nation agreement, which establishes a commitment to share

resource revenues from all resource development that occurs within the Elk Valley (Government of British Columbia 2013). This agreement is the first ECDA that is not project-specific and also includes commitments to share revenue from future developments (NDMF 2013).

While having an IBA in place is not a prerequisite for entering in to an ECDA, government is keen to see this happen as it helps to solidify and formalize the three way relationships between industry, First Nations, and the provincial government (NDMF 2013). The Tk'emlúps Indian Band (formerly the Kamloops Indian Band) and the Skeetchestn Indian Band, which collectively form the Stk'emlúpsemc of the Secwepemc Nation (SSN), exemplify what may be a trend in the future. The group has entered into an agreement with both the owner of the New Afton mine near Kamloops, New Gold Inc., completing a Participation Agreement in 2008 and an ECDA with the province in 2010 (New Gold Inc. 2008). The Participation Agreement with New Gold is inclusive of economic opportunities and social and financial benefits, and also secures the consent of the SSN to develop and support the project through all project phases (New Gold Inc. 2008).

While not a regulatory requirement, the successful negotiation of an IBA is increasingly seen by industry as a best practice that can help to secure social license to operate and ensure socio-economic benefits, as well as the protection of rights and interests for First Nations (PPF 2006; NDMF 2013). While the specific details of these agreements are typically not publically available, general terms covered in IBAs in BC tend to include provisions for business development, employment, training assistance and opportunities, and, in some cases, revenue sharing (PPF 2006; Merit Mining Corporation 2008). IBAs are one means through which Aboriginal groups can move from passive economic participation (e.g., employment and contracting opportunities) to more proactive involvement in project planning and implementation. For all parties, but perhaps most for First Nations, the contractual weight of legally enforceable terms and commitments that characterize IBAs make them an increasingly attractive instrument to help ensure First Nations receive a greater share of the wealth and opportunity generated by mineral development on their traditional territories and to provide additional assurances and mechanism for overseeing environmental monitoring and protection (Sosa and Keenan 2001; PPF 2006; NDMF 2013).

Notwithstanding the beneficial aspects of IBAs, commentators point out that they are not a panacea to the competing interests of Aboriginal communities, resource developers, and government resource managers (Sosa and Keenan 2001; PPF 2006; Fidler 2008). Their growth in popularity with industry is seen as a function of the lack of clarity around Aboriginal rights and title, traditional territories, and unsettled land claims because uncertainty around these issues is potentially a substantial risk for investors (Sosa and Keenan 2001; PPF 2006; Fidler 2008). There are concerns related to the confidential nature of most IBAs and the lack of transparency and government oversight, especially as IBAs increasingly encompass a broader range of social, cultural, and environmental issues beyond simple commitments to employment and economic opportunity (Sosa and Keenan 2001; IHRC 2010). There can be an imbalance of technical, legal, and institutional capacity between Aboriginal communities and mining companies that may leave the former in an inferior position when it comes to negotiating specific terms of an IBA (Sosa and Keenan 2001; Fidler 2008).

In BC, IBAs do not, as yet, have a formalized role in the mine approval process. However, other Canadian jurisdictions (e.g., Nunavut, NWT, Labrador) do have requirements for IBAs built into the

mine approval process, which are usually embedded within institutions that play a role in defining Aboriginal rights and title (e.g., treaty or land claims) (NLCA 2011; INAC 1984; and INAC 2005). The experience for First Nations in BC with the negotiation and implementation of IBAs, as with other dimensions of mining development, remains somewhat *ad hoc*. Nevertheless, overall First Nations are making gradual progress towards a more direct and meaningful role in the planning and management of mine resource development than they did even a decade or so ago (Sosa and Keenan 2001; PPF 2006; Fidler 2008; Heisler 2013).

REFERENCES

1996. *BC Mines Act*, RSBC. C. 293.

AANDC. 2011. *Aboriginal Consultation and Accomodation: Updated Guidelines for Federal Officials to Fulfil the Duty to Consult*. Aboriginal Affairs and Northern Development Canada. http://www.aadnc-aandc.gc.ca/eng/1100100014664/1100100014675 (accessed December 16, 2013).

Barrick Gold Inc. 2003. *Environmental, Health, Safety, and Social Responsibility Report*. http://www.barrick.com/files/responsibility-report/2003/Barrick-2003-Responsibility-Report.pdf (accessed February 16, 2014).

Barrick Gold Inc. 2009. *Open Letter from the Tahltan Nation Development Corporation on working with Barrick in British Columbia, Canada*. http://barrickbeyondborders.com/2009/03/open-letter-from-the-tahltan-nation-development-corporation-on-working-with-barrick-in-british-columbia-canada/ (accessed February 17, 2014).

CTV. 2012. *First Nations community split over Red Chris mine*. http://bc.ctvnews.ca/first-nations-community-split-over-red-chris-mine-1.956893 (accessed February 20, 2014).

Daum, H. 2013. http://www.cassiar.ca/cassiar_town/cassiar.htm (accessed February 14, 2014).

EAO, B. 2013. *Guide to Involving Proponents when Consulting First Nations in the Environmental Assessment Process*. British Columbia Environmental Assessment Office. http://www.eao.gov.bc.ca/FN_Consultation_Guide.html (accessed January 1, 2014).

Fidler, C. R. 2008. Aboriginal Participation in Mineral Development: Environmental Assessment and Impact Benefit Agreements. MSc diss., University of British Columbia, Faculty of Graduate Studies (Mining Engineering).

Government of British Columbia. 2013. *Economic and Community Development Agreements*. Government of British Columbia. http://www.newrelationship.gov.bc.ca/agreements_and_leg/economic.html (accessed February 14, 2014).

Heisler, K. 2013. *Scales of Benefit and Territories of Control: A Case Study of Mineral Exploration and Development in Northwest British Columbia.* Doctoral diss., Simon Fraser University.

Heisler, K. and S. Markey. 2013. Scales of Benefit: Political Leverage in the Negotiation of Corporate Social Responsibility in Mineral Exploration and Mining in Rural British Columbia, Canada. *Society and Natural Resources*, 26: 386-401.

IHRC. 2010. *Bearing the Burden: The Effects of Mining on First Nations in British Columbia*. The International Human Rights Clinic at Harvard Law School: Boston, Mass.

IISD. 2004. *Out of Respect: The Tahltan, Mining, and the Seven Questions to Sustainability, Report of the Tahltan Mining Symposium, April 4-6, 2003*. Dease Lake, British Columbia: International Institute for Sustainable Development (IISD) and Tahltan First Nation.

Kemess North Mine Joint Review Panel. 2007. *Panel Report: Kemess North Copper-Gold Mine Project*. Government of Canada: Ottawa, ON.

McPhee, A. 2013. Historic Agreements, Tahltan Honours. *Tahltan Central Council News*, June, 2013. http://www.tahltan.org/sites/default/files/newsletters/TCC%20May%202013%20Newsletter%20v4%20with%20Altagas%20change%20-%20WEB.pdf (accessed February 20, 2014).

Merit Mining Corporation. 2008. *Osoyoos Indian Band and Merit Mining Corp. Sign Landmark Impacts and Benefits Agreement*. Merit Mining Corporation press release. 05/12/2008. http://www.kitco.com/pr/1771/article_05122008210400.pdf (accessed February 20, 2014).

Nation Talk. 2012. *Tahltan Nation opposes approval of controversial Red Chris Mine*. http://nationtalk.ca/story/tahltan-nation-opposes-approval-of-controversial-red-chris-mine/ (accessed February 20, 2014).

NDMF. 2013. *Benefit Agreements in Canada's North*. Northern Development Ministers Forum: Priority Project on Sustainable Resource Development.

Nelsen, J., S. Malcolm, and A. Ostry. 2010. Sustainable Socio-Economic Development in Mining Communities: North-Central British Columbia Perspectives. *International Journal of Mining, Reclamation and Environment*, 24 (2): 163-79. DOI: 10.1080/17480930903185107 (accessed July 18, 2012).

New Gold Inc. 2008. *New Gold Inc. and Kamloops Division sign Participation Agreement with respect to New Afton Project*. New Gold Inc. press release. 03/24/2008. http://www.newgold.com/investors/NewGoldNews/PressReleaseDetail/2008/NewGoldIncandKamloopsDivisionsignParticipationAgreementwithrespecttoNewAftonProject/default.aspx (accessed January 15, 2014).

NovaGold Canada Inc. and Tahltan Central Council. 2006. *Comprehensive Agreement Signed for Tahltan Participation in NovaGold's Galore Creek Copper-Gold-Silver Project*. http://www.mdllp.ca/work/pr_tahltan_novagold.pdf (accessed January 15, 2014).

PPF. 2006. *Sharing the Benefits of Resource Developments: A Study of First Nations-Industry Impact Benefits Agreements*. Public Policy Forum. http://www.ppforum.ca/sites/default/files/report_impact_benefits-english.pdf (accessed January 16, 2014).

Rescan. 2012a. *Kitsault Mine Project: Nisga'a Economic, Social, and Cultural Impacts Assessment Report.* Vancouver BC: Prepared for Avanti Mining Inc. by Rescan Environmental Services Ltd. http://www.ceaa.gc.ca/050/documents/56146/56146E.pdf (accessed 19 December 2013).

Rescan. 2012b. *KSM Project: Nisga'a Social, Economic, Resource Use, and Cultural Survey Statistical Report*. Seabridge Gold Inc.: Vancouver, BC.

Simpson, R. G. 2003. *Independent Technical Report for the Galore Creek Property, Liard Mining Division, British Columbia*. Spectrum Gold Inc. http://www.infomine.com/index/pr/Pa139935.PDF (accessed February 14, 2014).

Sketchley, C. 2012. Improiving Consultation Processes between Mining Companies and First Nations in BC. Masters diss., Simon Fraser University, Faculty of Arts and Social Sciences, School of Public Policy.

Sosa, I. and K. Keenan. 2001. *Impact Benefit Agreements Between Aboriginal Communities and Mining Companies: Their Use in Canada*. Canadian Environmental Law Association, Environmental Mining Council of British Columbia, and CooperAcción. http://www.cela.ca/publications/impact-benefit-agreements-between-aboriginal-communities-and-mining-companies-their-use (accessed August 2, 2013).

SRK Consulting Inc. 2012. *Independent Technical Report for the Kemess Underground Project*. Canadian Securities Administrator (CSA): National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101). http://www.auricogold.com/files/doc_downloads/Kemess%20Underground%20NI43-101%20Technical%20Report%20(April%201%202013).pdf (accessed February 18, 2014).

Tahltan Nation and Province of British Columbia. 2013. *Shared Decision Making Agreement Between the Tahltan Nation and the Province of Brititsh Columbia*. http://www.newrelationship.gov.bc.ca/shared/downloads/Tahltan_SDM_agreement_signed_2013.pdf (accessed February 14, 2014).

TCC. n.d. *Red Chris Project Overview*. Tahltan Central Council. http://www.tahltan.org/sites/default/files/projects/Red%20Chris%20Overview.pdf (accessed February 20, 2014).

Wet'suwet'en First Nation. 2013a. *Wet'suwet'en First Nation Issues Stop Work Order Against Huckleberry Mines*. Wet'suwet'en First Nation press release. 05/01/2013. http://wetsuwetenfirstnation.ca/2013/05/01/wetsuweten-first-nation-issues-stop-work-order-against-huckleberry-mines (accessed January 15, 2014).

Wet'suwet'en First Nation. 2013b. *Wet'suwet'en First Nation reaches win/win agreement with Huckleberry Mines*. Wet'suwet'en First Nation press release. 07/24/1013. http://www.newswire.ca/en/story/1202461/wet-suwet-en-first-nation-reaches-win-win-agreement-with-huckleberry-mines (accessed January 15, 2014).

Wilson, D. 2008. *Mining and First Nations*. Victoria, BC: Legislative Library of British Columbia. http://www.llbc.leg.bc.ca (accessed January 10, 2014).